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THE

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FOR JANUARY 1870.

ART. I.—*On the Effect of Opium and its Derivative Alkaloids.* By S. WEIR MITCHELL, M. D., Member of the National Academy of Sciences. (Read before the Biological and Microscopical Section of the Academy of Natural Sciences, March 1, 1869, and recommended for publication in the American Journal of the Medical Sciences.)

IN the number of this journal for January, 1869, I recorded certain experiments which seemed to prove for pigeons an almost entire immunity from the influence of opium and morphia. Twenty-one grains of powdered opium, given internally; or, large doses of acet. opii under the skin; or, two grains of sulph. morphia used hypodermically, alike failed to produce any notable influence.

Repeating these experiments, Dr. B. W. Richardson, of London, attained similar results.

Two grains of acetate of morphia dissolved having been injected by this observer in three localities under the skin of a pigeon, the pupils were unaltered, the breathing somewhat slow and laboured, and the heart reduced in power. At the fifteenth minute slight emesis took place, and the temperature fell four degrees. For a half hour longer the bird seemed inclined to droop its head, but no further phenomena due to opium were perceptible.

In a second experiment a pigeon took on the first day 21 grains of solid opium; on the second day, 30 grains; on the third day 40 grains, and on the fourth 50 grains in one dose. The temperature did not fall one degree, and no other symptoms of poisoning occurred.

Dr. Richardson, after thus fully confirming my results, makes certain suggestions, pointing out the direction which should be followed in pursuing this research. These concern the relative susceptibility of other and especially carnivorous birds, the capacity of other alkaloids to poison

pigeons, and the reason why they escape the usual effects of opium. Some of these questions I had already set myself to answer, and, in the course of inquiry, others arose of equal or greater interest, and are more or less sufficiently replied to in the present paper.

The amount of opium which a pigeon may swallow without loss of life is so great as to enable me to assert that it is next to impossible to kill it in this manner. Dr. Richardson has compared in the following passage the relative susceptibility of the pigeon and the child of one year old.

"It is clear," he says, "that a pigeon can receive at once as much opium as would produce dangerous, or even fatal symptoms, if divided equally and administered to twenty children under one year old, the weight of the bird itself being at least fifteen times less than that of each child, or 200 times less than the combined weight of the children.

"*Expt.*—In February, 1869, desirous of learning whether it was possible to kill the pigeon with ingested opium, I chose a large bird, two years old, and gave him every day ten grains of aqueous extract of opium, night and morning, sometimes while fasting, at others during digestion. This was the daily equivalent of 40 grains of ordinary opium, so that at the close of eight days the bird had taken 320 grains of opium. During the following week I gave twenty grains of extract twice a day in bolus; more or less of this was vomited, but many doses were retained entire, and the pigeon had thus disposed in this one week of 280 grains of extract of opium. To sum up, in one fortnight, this bird ate much as usual; had its bowels relaxed somewhat, and vomited more or less, but showed no signs of coma, narcotism, or any muscular or sensory disability whatsoever. During this time it took in all 420 grains of aq. extr. opii—equal to 840 grains of opium."

I considered it useless to continue the experiment. Since this time I have occasionally given larger single doses, but nearly always they were partially gotten rid of by vomiting, either very soon after administration, or, as happened sometimes, twenty-four hours later, a fact which of itself proves how very slowly the poison is absorbed, and points thus to one of the elements which combine to protect the pigeon from fatal injury.

Expt.—July 20. I gave, by the mouth, 40 grains of aq. extr. opii at 3.23 P. M. July 21, at 2.20 P. M. while being handled it vomited about one drachm of brown fluid containing opium in large amount. During this twenty-four hours it was without food, but supplied with water. I should add that it also vomited 18 grains of like fluid an hour after it was first given. This was restored to the stomach, and no emesis occurred afterwards until the next day. It recovered without any symptoms of opium poisoning.

I next desired to learn whether the immunity, which seemed to be entire as regards ingested opium, was as complete when morphia was thus used. Accordingly—

Expt.—I gave a pigeon 7 grains of sulphate of morphia dissolved, by the mouth, at 5.20 P. M., July 13. For several days there was a slight but unusual tendency to crouch and keep still, but absolutely no other symptoms. The evacuations were healthy, or rather loose. Complete recovery.

Expt.—July 14. At 4.20 P. M. I gave, by the mouth, 12 grains of sulphate of morphia, dissolved in acidulated water. Held in the hand for half an hour; the pigeon trembled excessively and exhibited nausea. At 5 P. M., crouches; 5.40, pupils respond to light and dilate in the dark. July 15, 4 P. M. Found dead and rigid. Evacuations abundant.

Similar experiments were made with 1, 3, and 5 grains, but in no case did death occur. In another experiment 9 grains failed to kill, and a repetition in another pigeon using 14 grains caused death during the following night.

It thus became probable, first, that as regards poisoning with morphia internally, there is some individual difference among pigeons, irrespective of age; second, that the immunity is not absolute when morphia is ingested; and third, that as large a dose as 12 grains may be needed to insure death. It is possible that a smaller amount might, in rare cases, destroy life, but as the following observation proves even 12 grains may fail to secure this result.

Expt.—July 23, 3.05 P. M. My assistant, Mr. Landis, gave a pigeon, by the mouth, 8 grains of dissolved sulphate of morphia. At 3.30 it vomited a few drops, and at 4.30 took four additional grains. On the 26th it was well, lively, and particularly quarrelsome, and on the 30th was still in perfect health.

A second series of experiments were directed towards discovering what amount of morphia might kill when used hypodermically. As regards this point, I was surprised to find that wide differences were visible in different pigeons. This was partly due to various and easily seen causes, but in part also to reasons which probably rest on the idiosyncrasies of the birds employed.

Thus, pigeons of two or three months old were commonly killed by injections into the groin of half a grain to one grain, but sometimes, though rarely, survived two grains. The same amounts used under the skin of the back were much less fatal.

Older birds of the second year, as in Dr. Richardson's experiments and my former ones, were rarely killed by doses under two grains in the groin. I find recorded but one death from one grain, while the escapes from this fate are rare in pigeons which have received in the groin more than three grains. The present series of observations, therefore, show a singular range of susceptibility, and indicate very distinctly that, as regards hypodermic injections, the pigeon enjoys no such complete immunity as seems to obtain with opium given by the mouth, while as compared to morphia internally administered, the hypodermic method is vastly more fatal.

The phenomena of opium, or rather morphia poisoning in birds, are extremely interesting, from the absence of nearly all of the symptoms which are usually supposed to characterize this mode of death. My observations were made upon pigeons, chickens, and ducks, and lead to the belief that the latter two are nearly as difficult to poison as the pigeon. Unfortunately, I have been unable to secure any purely carnivorous bird with which to follow out one of Dr. Richardson's suggestions.

It is singular that birds should have been so rarely used as subjects on which to study poisons. Flourens has some almost forgotten cases of the poisoning of little birds by opium, with certain symptoms and pathological

appearances such as I have never met with in larger birds. I mention them at some length in a note,[1] not having been able to repeat them in the same species as he employed.

When a lethal dose of morphia is put in the groin of a pigeon, the bird seems unaffected for a few minutes or longer, and then tries to find a corner as far as possible from observation. Presently its gait becomes unsteady, and the tail is twitched up at intervals in an uncertain fan-like movement, or the wings stir in abrupt, short jerks. An increasing awkwardness follows, till at length the bird falls, and then, or while still erect, is seized with general convulsions, between which the breathing is seen to be very laboured. Meanwhile the darkened mucous surface of the mouth and larynx show how the blood is suffering, and at length it dies suddenly in violent convulsions. In no case have I seen sleep precede death, nor in any have I observed well-marked constipation. I have measured the pupils many times without noticing any such changes as opium causes in man. It may not be uninteresting to add that atropia, either in the eye, or given internally, has on the pigeon's iris no visible influence, except in some profound poisonings, to cause a curious swift alternate contraction and dilatation within a very small range of movement.

In birds, as in mammals, morphia lowers the temperature when it acts at all as a poison. The occurrence of convulsion not only checks this fall, but may suddenly elevate the column to the normal standard or even above it. No mode of exercise seemed competent to produce in the healthy pigeon a rise of more than one and a half degrees, but when opium had lowered the general temperature, then a convulsion was able to send the mercury up three to five degrees, so that, in some instances, there was the anomaly of the pigeon dying, with a temperature above that it possessed before being poisoned.

[1] My friend Dr. William Pepper assures me that he saw a large cockatoo survive unharmed an accidental dose of eight grains of aq. extr. opii.

M. Flourens' experiments are somewhat surprising. He used sparrows chiefly, and found that one grain of aq. extr. opii caused the bird to fall into a *stupor* at the close of fifteen to twenty minutes. At first light and easily interrupted, it became at last so profound that neither noise nor light availed to awaken him. Birds affected walked when pushed, flew when cast in the air, and on being let alone, took anew the attitude of deep sleep, the head turned beneath the wing. Larger doses produced convulsion and death, and the author found in a large number of cases, an effusion of blood between the two cranial tables, which, in small birds, can be seen to form during life. This symptom is also said to occur in pigeons, nor, according to Flourens, are these exempt from the phenomena observed in smaller birds. The text of this passage is somewhat dubious, but seems to be intended to describe as identical the signs of opium poisoning in pigeons and sparrows. I confess myself unable to reconcile the statements of this eminent physiologist with those made by Dr. Richardson and myself. Are pigeons different in France and in America?

The following selection from the records of a large number of experiments may suffice to illustrate the symptoms just described :—

Expt.—July 19. Pigeon, second year, rectal temp. 109 1/10° F., received in groin at 4.10 P. M., two grains of dissolved sulphate of morphia. Within one minute appeared unsteadiness of gait, the fan-like flirting motion of the tail, and soon positive rocking forward, with slightly laboured breathing. At the 20th minute, an effort to use the thermometer excited a great deal of struggle. The temperature was noted as 111 1/2°. Fortieth minute, symptoms the same, temperature 109 1/2°. The pigeon was now released and chased about, when the temperature was found to be 110 1/2°. Sixtieth minute, remained seated, gasping somewhat; slight general tremor; neck muscles weakened and respiration more difficult; temperature 109 1/2°. Convulsions at 64th minute, consisting in alternate motion of the two wings, and also of the two legs, with flexion of the toes. These spasms were brief, and not violent. During the intervals, a loud sound seemed to excite sudden and abrupt movements in the wings. Unable at this time to stand at all. At the 70th minute, temperature 109 3/5°. The pigeon fell into a general convulsion of great violence, which passed into others of less severity at very short intervals. Death occurred at the 80th minute, the thermometer marking a rectal temperature of 113 1/5°. Post-mortem rigor began in one minute in the legs.

Expt.—Pigeon; received in groin five grains of sulph. of morphia at 4 P.M. The symptoms were, in succession, uncertainty of movement, with jerking motions of wings, tail, and legs, increasing by laboured breathing; the darkened mouth of asphyxia; at length, unable to stand, convulsions, general in character, with flexion of the toes, and not tetanic in type. Meanwhile, continued fall of temperature, with a rise of over three degrees during the final and fatal convulsion.

If, now, this curious rise of temperature be due to the heat evolved during the excessive and morbid exercise of the muscles in spasm, it must be sufficient to overcome, and more than overcome the tendency to loss of temperature owing to poisoning by morphia. Other and very different causes connected with the vaso-motor nerves may be also at work; but, at all events, the subject would repay close study.

Thus far my observations exhibit a very striking uniformity of symptom among the pigeons studied. Always there were unsteadiness, laboured breathing, increasing signs of apnœa, unaltered pupils, and finally general convulsion and death. In no instance was there any true hypnotic effect.

The influence of opium and of morphia salts upon the domestic chicken and duck were also studied; first, with a view to learning whether these, like pigeons, were difficult to poison; and secondly, what were the symptoms caused by lethal doses.

Expt.—Sept. 15. A large cock chicken received in the thigh 1 grain of dissolved sulphate of morphia. No effects were visible.

On Sept. 17, five grains similarly employed produced no notable symptoms.

Sept. 20. A cock chicken received, subcutaneously, in the groin, ten grains of sulph. morph. at 2 P. M. At 3.30, is inclined to stand still; mouth remains open, respiration quick and laboured. Eyes shut; rocks on his feet, and inclines to fall backward. Finally crouches, and at times makes ineffectual efforts to stand, being occasionally successful, and again sinking suddenly on his breast. He is now, 5 P. M., extremely feeble, the eyes being shut, and the head swaying to and fro; frequent watery stools. At 5.30 same condition. The next day he was well and fed eagerly.

Sept. 22. I injected into the breast and two thighs of this same bird twenty grains sulph. morph. Injection occupied five minutes. Released at 2.15 P. M. He ran to a dirt-pile, and scratched in pursuit of food. At the 8th minute signs of distress appeared; eyes shut, mouth gaping, unsteadiness on feet. 2.45. Crouches. 3.20. Unable to stand when pushed or teased; occasional convulsive starts. 3.40. Restless, frequent starts; watery stools; eyes unaltered; breath laboured. At 4.7, sudden and violent convulsion, with legs rigidly extended. The fit lasted a few seconds, and was followed by quietude, now and then broken by spasmodic extensions of the legs, the bird lying on his side and uttering a curious note like a faint bark. 4.9. Convulsion as before. 4.12. Lies on side; frequent spasms of legs in extension, the head remaining at rest, and the wings merely twitching; respiration gasping in character, and death at 4.14, without other symptoms.

Expt.—A hen took, by the mouth, thirty grains of extract of opium without visible after-effect.

Expt.—In this case, the exceptional excitement of brain by opiates was noticed, and a range of symptoms somewhat unlike those which we commonly see in the chicken. A hen received in thigh ten grains of sulph. morph. at 4.23 P. M. At 4.25 became unsteady; mouth open, respiration irregular and laborious. 4.29. Crouches. At 4.55, somewhat better. Took, by mouth, 100 drops acet. opii. At 5.10, after having been tranquil and sleepy, eyes shut, and standing up, had a period of what looked like delirium with vertigo. He ran to and fro, and at last rotated to the left for half a minute. Presently this passed off, and at 5.30, had a second turning fit. After this he was sensitive to light and sound, and at one time as if half asleep, and presently again excited, and furiously attacking a duck. After this the rotations were frequent. They began with a cry and a ruffling up of the neck feathers. At 5.36, violent turning, after which he crouched; but at 5.40 he was evidently weak, and the turnings became converted into swift shuffling to the left. Then he fell on the left side and had twitchings of feet and wings, synchronous with the laboured breath, the head jerking incessantly. At last he had a single general convulsion, ending in death at 6 P. M. Rigor in the legs set in within one minute.

Expt.—A large duck showed no evidence of poison from six grains of morphia at one time, and nine at another a week later. Ten grains thrown into the groin caused emesis in one minute. After 40 minutes he was so little influenced, that I gave in like manner twenty grains. In two minutes he crouched, unable to stand, and showed great distress in breathing. In a few minutes he rallied, and, when walking, would fall suddenly, his legs slipping out apart from one another. Then he began to twitch all over, uttering an incessant quack, and at the 68th minute fell in violent tetanoid convulsion, the feet extended, the head thrust out. The fit ended in sudden death.

I have also examined the effects on birds of some of the rarer alkaloids of opium. In order to enable observers to compare my observations with those made upon mammals, I have exacted from each specimen of the alkaloid used a rigorous identity, in chemical reaction with that employed by Dr. Harley. I found the need for precaution in one specimen of Thebaia (Paramorphia), which gave altogether different results from a second supply. (For the latter, and for the most courteous interest in my investigation, I have to thank Messrs. Powers & Weightman). Of cryptopia, the latest discovered of these bodies, I have been able to get but a small specimen, amounting to one grain—a fact which I greatly regret since reading Dr. Harley's very interesting account of its physiological effects.

Narcotina seems to have been omitted by Dr. Harley in his examination of the opium alkaloids, for what cause does not appear. By many authors

it is classed as inert. Orfila found that thirty grains were required to kill a dog, but it has been given by Dr. Garrod to man in doses of thirty grains, and was reported by him and O'Shaughnessy to be merely tonic and anti-periodic. Doses of 120 grains are said to have been given to man without effect.[1] I have taken narcotina several times, in doses of 5, 10 and at last 30 grains with no result save some slight gastric embarrassment which may possibly have been due to other causes. The specimens used by me were two in number. The first, indicated as No. 1 narcotina, was made by Powers and Weightman. The second, similarly distinguished as No. 2 narcotina, was manufactured many years ago by Robiquet, Boyveau & Pelletier. Both gave the usual chemical reactions.

Expts.—Narcotina was given to pigeons by the mouth in powder or dissolved in acids, in doses of two to six grains, but without obvious effect.

Expt.—To a large pigeon, five grains of narcotina No. 2, dissolved, were given subcutaneously at 4.26. Temp. of rectum 108°. Within four minutes some twitching of the tendons of the feet was visible, giving rise to slight unsteadiness of gait. At the 5th m. nausea and vomiting; 7th m. moves about in an excited way, then suddenly has retraction of head, difficulty of breathing, and successive general convulsions. The effect on temperature was in this case remarkable, because, despite continued convulsions rarely interrupted during half an hour, the mercury fell to 96° F. five minutes before death, which took place at the 84th minute.

Post-mortem examination.—The right heart was still acting, and all the muscles appeared to be irritable. In another case, three grains, by the groin, and five of No. 1 narcotina by the crop, caused death within twelve hours.

Expt.—One and a half grains of No. 2 narcotina dissolved in water and sulphuric acid, and put under the skin in three places, caused, in thirty seconds, excitement, feebleness, convulsions of tetanoid nature, irregular respiration, and death in ten minutes.

In many instances pigeons escaped death after hypodermic doses of two grains, but very generally such amounts produced feebleness, unsteady gait, and early convulsions, depending less than in morphia upon the previous induction of apnœa. None of the birds were affected with stupor, and in all the tendency to convulsion was the predominant symptom.

The facts I have here recorded are among the most curious which have fallen under my notice in the course of this inquiry. That a drug which is apparently incapable of killing man should be so fatal a convulsivant to the bird appears to me most remarkable, and as contrasted with the opposite case of opium, a poison for man, and with difficulty hurtful to the pigeon in any mode of administration, the toxic energy of narcotina must certainly be regarded as among the most singular facts in toxicology.

Thebaia.—This alkaloid, some times known as Paramorphia, corresponded absolutely as to chemical reactions with that used by Dr. Harley. It was made by Powers & Weightman, of Philadelphia. The tetanizing action of this agent has long been known; a dog, according to Harley, has been killed by two grains used hypodermically, and mice perished from

[1] Gmelin, Handbook of Chem., vol. xvi. p. 137.

the use of $\frac{1}{12}$ to $\frac{1}{20}$ of a grain. It proved speedily fatal to pigeons, causing terrible tetanic spasms as related in the two following experiments :—

Expt.—A pigeon received in the groin one grain of paramorphia partially dissolved. At the close of a minute the pigeon was seemingly unaffected. But suddenly fell into the most terrible tetanic spasm, the feet thrown out, the head turned back and twisted to the left. The wings merely quivered a little, the legs being most affected. So intensely violent were the spasms which succeeded, that while they endured, respiration was altogether impossible. Death occurred in two minutes.

Expt.—A pigeon received in the groin one-third of a grain of paramorphia dissolved in thirty mm. of acidulated water. Vomiting occurred within a few seconds followed by sudden and violent tetanic convulsions, with scarcely an interval of repose until death took place at the close of one minute and thirty seconds. In these spasms the limbs were extended rigidly, the spine bent, the tail turned up, the head thrown back and twisted almost completely around so that the beak pointed towards the tail.

Comparing these with cases of strychnia poisoning, I have been unable to detect any essential difference. The tetanic spasm, a tendency to which is exhibited by birds to which narcotina has been given, finds here in poisoning by thebaia a perfectly typical presentation, while, as we have seen, a likeness to the strychnic spasm may be sometimes observed in the deaths of birds poisoned by morphia.

Meconine.—This alkaloid, prepared by Rosengarten & Sons, responded to all the usual chemical tests. Dr. Harley states that he is unaware of any observations upon its toxic action, and quotes Orfila to the effect that three grains thrown into the jugular vein of a dog produced no ill results.

Dr. Harley ascribes to it slight tranquillizing and hypnotic effects when placed under the skin in doses of one to two grains, but saw no such influence from the ingestion of five grains. I myself have taken first two and on another occasion six grains suspended in cold water without effects of any perceptible character, and since birds are not put to sleep by the other opium derivatives, I was prepared to find no result from meconine, which is only slightly soluble in water at the normal temperature of the pigeon.

Expt.—Eleven grains of meconine were made into pills with soap and given to a pigeon at 4.10 P. M. Vomiting took place in a few minutes and repeatedly afterwards for two hours. No other symptoms were noted.

June 17. Six grains, partially dissolved and in part suspended, caused vomiting when ingested, but gave no other evidence of activity.

June 16. Twelve grains administered in the same way produced no other result.

I suspected that the irritation of stomach might be due to the presence of the needle-like crystals of this alkaloid, for which chloroform alone is a perfect solvent. At all events its difficult solubility must render it very slow of absorption; and, in this as in other like cases, may interfere to prevent the exhibition of symptoms which might be observable if we possessed a solvent vehicle capable of readily conveying it into the blood.

Expt.—In three instances I placed under the skin in a state of partial solution in hot water, 3, 8, and 12 grains of meconine. The injections were made with a hypodermic syringe, armed with a tube large enough not to be clogged

by the fine crystals. The alkaloid was fully dissolved in boiling water, which was allowed to cool to 100° F.—the fluid being constantly stirred so as to insure the precipitating crystals being as small as possible. At first I thought that the agent thus used tranquillized my pigeons, but further observations showed this tendency to repose to be due rather to the desire of a pigeon so wounded to remain at rest than to any toxic power of the salt employed.

No convulsive symptoms occurred in any case, and as I have said no conclusive signs of stupor appeared.

It thus appears that meconine is only emetic when given to birds by the mouth, that it has no perceptible power to hypnotize or to excite the brain or spine when used under the skin, and that six grains of it taken internally by man have no appreciable influence.

Codeia, considered by Magendie to be a hypnotic and stupefier, and to be for these purposes half as strong as morphia, has also been examined of late by Harley. This latter observer[1] (p. 169) seems to have some doubt as to the codeia used by M. Bernard, and refers to a statement made by himself, p. 141 of his treatise, for the reasons justifying this doubt. On referring to the page in question I do not find, however, any such explanation, except as regards narceine.[2] At all events, my own codeia, made by Rosengarten & Sons, answers to all the requirements of Dr. Harley's identifying tests. Bernard considers it as a hypnotic when given to dogs in doses of $\frac{1}{77}$ gramme; but Harley finds that in doses of two or three grains hypodermically employed it causes only depression of the respiratory system and of the cardiac function, and a latent tendency to convulsion. In the mouse it produced like results, ending in tetanic convulsions and death. In four to five grains it causes in man some disposition to sleep, but never occasions in these amounts any decided effects of this character. Like morphia, it at first raises the pulse, contracts the pupil, and very often gives rise to gastro-intestinal derangement. I have myself taken five grains in one dose after failing to secure marked results from two grains. The former dose was taken fasting. In an hour the pulse had risen 20 beats per minute, and I felt slight giddiness, nausea, and a sense of heaviness about the head without any remarkable desire to sleep. These symptoms slowly passed away, leaving me with a sense of gastric oppression for two or three days.

[1] The Old Vegetable Neurotics, by John Harley, M. D. London, 1869.

[2] I quote from a letter of Dr. Harley to me, dated Nov. 1, 1869, the following remarks, which serve to clear up the matter spoken of in the text: "First as to Bernard and codeia. My reasons for referring to p. 141 to show that the codeia used by him was doubtful, was as follows: Bernard there says that narceine is more valuable than codeia. At p. 142 of my work, I show that what we English call pure narceine is one of the most insoluble constituents, not only of opium, but of the whole vegetable kingdom. Where shall we find another substance that is neither soluble in water (for water which only dissolved $\frac{1}{1000}$th part can hardly be called a solvent) nor in alcohol, nor ether, nor chloroform? Turning to codeia (p. 160) we find it soluble in 25 parts of water and in 40 of ether, while it is miscible in almost any proportion with alcohol and with chloroform. If Bernard could say that narceine was more soluble than codeia, what was I to think of his codeia on the one hand, and of his narceine on the other? for as soluble bodies they seem to me the exact antipodes of each other."

These observations scarcely prepared me for the powerful influence which codeia exerts on pigeons.

Expt.—I placed under the skin in three localities seven grains of codeia dissolved in water, with the aid of nitric acid. Before I could set the bird at liberty violent convulsions came on, ending in death within one minute. These spasms were not tetanic.

Expt.—One grain dissolved was used under the skin of the groin. When released the pigeon moved about in what seemed to be a delirious restlessness, but which in a few moments was clearly made out to be the state of muscular irritability which precedes convulsions. The bird shifted about uneasily, flapping his wings and stamping his feet in incessant motion. This was followed, or rather this increasing passed into general convulsions, with flapping of the wings, jerking of the head, and alternate flexure and expansion of the feet and toes, until death took place in three minutes.

Expt.—Half a grain of codeia produced like results, and death in eight minutes.

These, with other observations, enable us to draw a distinct line as to convulsing energy between this drug and morphia, since doses of the latter agent not exceeding a grain, often allow of escape from death, and even larger quantities only effect destruction to life after a far greater lapse of time.

Narceine.—In regard to this substance, there seems to have been a certain confusion which must have arisen from the employment by various observers of substances which under one name possessed different qualities, both physical and physiological. Claude Bernard looks upon narceine as superior even to morphia in its somniferous power. He states also, that it is free from any convulsivant or excitant action, and that animals killed by it die in a state of muscular relaxation, such as I have never found to occur with pigeons under any of these agents.

The French and German observers generally regard it as a gentle hypnotic. Dr. Harley is distinctly of opinion that the drug used by Bernard was not pure narceine because of its far greater solubility in water than the alkaloid described by Pelletier and recognized as narceine in England. Dr. Da Costa appears to have had similar doubts, and Mr. T. Smith, of Edinburgh, informs Dr. Harley that meconine which separates with narceine may give it the appearance of increased solubility.

I have taken it myself (Merck's narceine) in doses of one-half a grain up to five grains. The latter dose alone produced any effect. It was taken dissolved in warm glycerine—two drachms with one drop of sulphuric acid. An hour after taking it I felt a slight headache and sense of constriction, but observed no change in the pulse or the respirations. I was doubtful as to whether or not it caused any hypnotic effect, and conclude, therefore, that it can hardly be very powerful. I had no dysuria. How to explain the discrepancy between such facts as this and others of like nature observed in my own practice or that of Dr. Da Costa, I do not see, unless by supposing, with Dr. Harley, that the alkaloid as furnished varies remarka-

bly. In his hands this agent was found to be a gentle hypnotic, but owing to its insolubility unfitted for hypodermic use.

The great therapeutic importance recently assigned to narceine by Bernard, and supported by the clinical observations of Bèhier and others, induced me to examine the alkaloid with unusual care. I have studied specimens from three distinct manufacturers, and regret having been unable to add one of French origin. I give in tabular shape the appearance, colour-reactions, and relative solubility of each make of narceine.

Physical Characters.

No. 1.	No. 2.	No. 3.
E. MERCK.	POWERS & WEIGHTMAN.	FOREIGN, OF UNKNOWN MAKE.
"Compressed asbestos-like mass of soft acicular crystals, very light and colourless."—HARLEY.	Like No. 1, but slightly tinted with pink, probably an accidental impurity, more loose in texture and more bulky than No. 1.	Like No. 1.

Solubilities.—No. 1. Merck's is soluble in 1000 parts of distilled water at 60° F.
No. 2. Powers & Weightman's dissolves in 4000 parts of water at 60° F.
No. 3. Foreign, maker unknown, imported by Bullock & Crenshaw, soluble in 2100 parts of water at 60° F.
No. 1. Merck's narceine is wholly soluble in 95 parts of water at 212° F., and begins to precipitate at 175° F. At 140° F. a large part has separated from the solvent.
No. 2. Powers & Weightman's is dissolved by 300 parts of water at 211° F., and begins to precipitate at 160° F. At 90° F. not one-half has separated.
No. 3. Procured from Bullock & Crenshaw; maker unknown; is dissolved by 175 parts of water, at 212° F., and begins to precipitate at 190° F.

Dr. Harley's narceine, made by the Smiths (Edinburgh), or by Morson, was more soluble than any of my specimens. One part was soluble in 100 of water at 212° F., and in 400 parts of water at 60° F. Bernard's narceine was made by Merck, of Darmstadt; by Menier, of Paris; and with unusual care by Guillemette, of the same city. This correspondence in the make of the substance between his narceine (Merck's) and mine still further complicates this puzzling question.

I give next the colour tests which are less reliable for identification. It is to be regretted that Bernard does not supply either these or the solution tests.

Colour Tests.—Hydrochloric acid, sp. gr. 116, diluted five times with water gives with

No. 1.	No. 2.	No. 3.
A fine blue.	A fine blue.	Dissolves without colour.

All the specimens dissolve in the pure acid without colour.
Nitric acid gives

No. 1.	No. 2.	No. 3.
Orange yellow,	Orange yellow,	Orange yellow,

with aqueous solutions. A morsel of narceine let fall on a drop of the pure acid gives a yellow centre and orange edges.
SO_3 dissolves all three of the specimens with a deepening amber hue, which becomes greenish orange in Dr. Harley's narceine, as in all of mine, and finally

takes a port-wine red. On heating, it then becomes chocolate-brown with a purplish tint. On adding 100 parts of water, fine brown flocculi are seen, and an excess of potassa at length throws down, in his case "a quantity," in mine a moderate amount of dark brown flocculi, the proportion varying in the three specimens, but in all leaving above a colourless fluid.

The great discrepancy as to solubility, and in one case as to one of the colour tests, makes it difficult to conceive of the various specimens as being identical in chemical construction. I have tested all three on myself, in doses varying from two to five grains, without any notable result.

The three following observations represent the influence of this drug upon the pigeon.

Experiment.—Two grains of narceine, Merck's, were dissolved in 30 mm. of hot glycerine with one drop and a half of chlorohydric acid. The solution was clear on cooling. It was injected into the two groins in three localities. There may have been some slight difficulty of breathing within a few hours, but no other result.

In two others I used four grains hypodermically, employing the other specimens of narceine, that is Nos. 2 and 3, but was unable to observe any marked result.

Since the date of these observations I have repeatedly injected five to six, and once nine grains of narceine, dissolved in acidulated glycerine, but, except the often noted tendency to rest quiet in a corner, no symptoms of moment were seen.

In the confusion which at present obtains in regard to the various manufactures of narceine, I am unwilling to draw any very absolute conclusions, but it certainly appears that the agents employed by Harley and myself must be different from that used by Bernard. Perhaps it were safe at least to assert that some of my specimens must represent a large percentage of narciene, or may indeed be pure, so that in any case we may confidently conclude that narceine is among the lowest of the opium alkaloids in its power to produce convulsions, the pigeon being taken as the agent most susceptible to this form of toxic impression.

Cryptopia, the last discovered of these numerous and interesting bodies, has been examined physiologically, or rather clinically, for the study was not a full one, by Dr. Harley, who considers it to be a cerebral excitant, and to a less degree an hypnotic. In large doses it dilates the pupil, and as a somniferous agent is regarded by Dr. Harley as being twice as active as meconine or narceine, and one-fourth as powerful as morphia.

I have been able to secure but one grain of cryptopia, but as this was of the make of T. & H. Smith, the discoverers, I considered it to be identical with Harley's. The small amount of the drug in my possession necessarily limited my experiments.

Expt.—One-fifth of a grain of cryptopia used under the skin of a pigeon caused nausea and efforts at emesis in five minutes. At 15th minute the bird appeared to be weak, and the breath was long and laboured. It was seemingly well next day, but was found dead on the morning of the third day. I had of course a good deal of doubt as to this result being due to the cryptopia, and

these doubts were strengthened by the absence of any more marked results in a second pigeon, which received subcutaneously half a grain, and did not die.

Since reading the first proof of this paper, I have to thank Dr. Harley for a larger amount of cryptopia, and to express my regret that it came too late to admit of my adding any new experiments.

Porphyroxin and *papaverine*, which complete the list of alkaloids of opium, I have been unable to procure. These various agents possess, as has long been known, very diverse effects. Taking morphia as an example, in some persons it causes only cerebral excitation with delirium and insomnia. In others it affects chiefly the spinal centres, occasioning nausea and emesis of obstinate character, while in very rare instances, one of which was illustrated recently in the person of a physician of this city, it produces tetanoid symptoms. More commonly it brings on sleep, but these influences may coexist in various degrees in the same person, or one or two only may be perceptible.

Dr. Harley has pointed out the fact, that in different animals one or other of these effects largely predominates, and has thus illustrated anew the necessity of studying every poison on numerous classes of animals, a precaution upon which I have more than once insisted. My present research still further emphasizes the need for an enlarged method of study.

In all of the animals examined by Dr. Harley, sleep was produced, though with an amount of difficulty, and from quantities of morphia largely varying in the several cases, while in the mouse and the horse, the action of this drug on the spinal centres was probably more notable than in man. A comparison of these results with those which I have obtained in birds, is alike interesting and instructive. We have in the latter a class of beings which, for reasons presently to be stated, are practically incapable of being poisoned by the ingestion of opium, and which are affected only by enormous doses of morphia. Where the latter has been given in sufficient amount, we have, up to the moment of convulsion, absolutely no induction of sleep or stupor, neither do we observe any loss of sensation, general or special, but the heart is quickened, and respiration made laborious, by the influence of the poison upon the respiratory centres. The convulsions which precede death seem to be sometimes due to asphyxia, and are then incessant up to the moment of death, while in others they seem to be due merely to a general excitation of the motor ganglia, since they occur at intervals, with periods of comparative freedom intervening.

Neither can I agree with Baxt or Bernard in regarding the convulsions caused by morphia as being always tetanic in character—a point, however, on which I shall have further occasion to dilate. In birds, then, morphia acts with difficulty, causes no sleep and no delirium, and strikes chiefly the motor and spinal centres, affecting very early the respiratory ganglia, and to a certain extent depressing the temperature. There is one reason for

this marked influence on breathing, which is explicable by certain peculiarities of the respiratory organs. In man and mammals generally, the motor nerves of respiration leave the spine high up in the cervical region, and the essential fibres run a short course to their respective muscles. In birds, however, the respiratory organs extend into the lower belly, and the movements of this part, as well as of the regions above it, seem necessary to sustain life. The nerves of respiration emerge at various points all the way down to the lower dorsal vertebræ, and a cross section of the spine anywhere above this point causes sudden death. The large number and great length of these nerves have probably something to do with the readiness with which the breathing becomes embarrassed, with the prominence, in a word, of this symptom.

M. Bernard has divided the effects of the various opium alkaloids into three classes, soporific, convulsive, and toxic; one or other of the three being predominant in the case of each of these agents, but not of necessity to the exclusion of the other two. M. Baxt in like manner arranges them under the two heads of convulsives and narcotics, while Harley is disposed to consider that all of them are alike excitant, and hypnotic in varying degrees. Each of these observers may be absolutely right as regards the physiological reactions of the alkaloids in question, considered with reference to certain animals, but the attempt to apply their conclusions broadly so as to include birds, only serves to show the great necessity for caution in all such deductions.

Let us compare the results obtained by Bernard and Baxt with my own, premising that as yet, with the exception of morphia, these alkaloids have never been as thoroughly studied as belladonna or woorara, and that neither Bernard's classification, nor Baxt's, nor mine, is more than a mere toxicological sketch.

M. Bernard believes, as I have said, that the opium alkaloids have three properties or powers: 1. Soporific; 2. Excitant or convulsing; and 3. Toxic. He classes them thus in the order of their power.

Excitant or convulsive agents.—1. Thebaine. 2. Papaverine. 3. Narcotine. 4. Codeine. 5. Morphine. 6. Narceine.

Soporifics.—1. Narceine. 2. Morphine. 3. Codeine. The three others have no soporific force.

In capacity as poisons, viz., toxics.—1. Thebaine. 2. Codeine. 3. Papaverine. 4. Narceine. 5. Morphine. 6. Narcotine.

What strikes us most about this arrangement is the want of relation between toxic power and capacity to convulse, as instanced in the position of narcotine, and the high place as a soporific assigned to narceine.

Waldemar Baxt, quoted in *American Journal of Medical Science*, October, 1869, regards the opium alkaloids as either narcotic or tetanically convulsive. In narcotic energy, he arranges them thus: 1. Papaverine; 2. Morphia; 3. Narceia; 4. Codeia; etc. As convulsives thebaine

stands first, porphyroxin second, narcotine third, codeia fourth. Dr. Harley's view of the matter from this standpoint varies from that of Bernard or Baxt, and there are so many discrepancies among the three observers as to indicate the need for a still further examination of the subject. For reasons already pointed out, I have limited my own experiments to birds, and despite the statement of Bernard as to the power of morphia, codeia, and narceia, to produce in pigeons and sparrows the forms of sleep which he regards as peculiar to these drugs, I have been unable to detect anything in this direction, beyond a slight tendency to quietude, which we can never be sure is not due to the habit of the wounded or sick pigeon of seeking a remote corner and remaining at rest.

As regards power to stupefy, I can therefore make no classification. My experience with cryptopia has been too limited to allow of any positive conclusion. All but two of the other alkaloids examined by me cause convulsions, but thebaia alone appears to be truly a tetanizing poison, although in the duck, and rarely in the pigeon, morphia caused spasms, which may be termed tetanoid. Thebaia stands highest in rank as a convulsant, and is followed in order of power by narcotina, codeia, and morphia, meconine and narceine having no such influence. In this arrangement of narcotina I agree with Bernard and Baxt. Neither of them makes mention of meconine, which Harley regards as distinctly hypnotic, but which is almost without influence in the pigeon, even when given in enormous doses.

My own arrangement of the relative poisoning power of the substances we are considering would be as follows:—

1. Thebaia; 2. Codeia; 3. Narcotina; 4. Morphia — Meconin and Narceina being too innocent for addition to the list. It will of course be remembered that this statement applies only to birds, and chiefly, indeed, to pigeons.

The conclusions which I have finally reached in regard to the influence of opium alkaloids on birds are as follows:—

1. Birds: namely, ducks, chickens, and pigeons, are never poisoned by crude opium, its aqueous extract, or acetum opii (black drop), given internally; while the salts of morphia must be given in enormous doses to produce fatal effects when administered in the same manner.

2. Morphia salts, used hypodermically in excessive amounts, never cause sleep or stupor, but act as excitants (convulsants) upon the motor centres. In some instances, the spasms are tetanoid in character; but in the duck they approach nearest to the typical strychnic spasm.

3. Thebaia is a tetanizing agent, only inferior in energy to strychnia and brucia.

Narcotina, almost inert in man, destroys birds when employed hypodermically, in doses of from 2 to 7 grains.

Codeia is a fatal convulsing agent in birds (pigeons).

Meconin causes emesis when given internally, and is harmless if placed under the skin.

Narceia has no perceptible influence, except to disturb slightly the respiratory function.

Cryptopia in doses of $\frac{1}{6}$ to $\frac{1}{2}$ gr. has no effect.

None of these agents cause sleep in the pigeon, duck, or chicken.

The inaction of ingested opium is due, as I believe, to two causes.

First, to the very great slowness with which it, as well as morphia, is absorbed. This is shown by the fact that, twenty-four hours after a full dose has been given, the pigeon may vomit it in large quantities. In a few cases, the greater bulk of what I had given was thus rejected; but in many others all was retained.

The remaining amount of protection necessary to constitute an insurance against fatal results, must be due to the great difficulty with which pigeons, especially old birds, are poisoned by opiates. Probably elimination is sufficiently rapid to protect the system against a dangerous accumulation of the drug; but since the feces and urine are evacuated from a common cloac, I have been unable to study the rate of excretion in a satisfactory manner.

Pigeons, and probably other birds, seem to possess the same peculiarity which causes certain men to exhibit, under opiates, only excitement of the motor ganglia, emesis, and a restlessness, which, with fuller doses, might possibly eventuate in convulsions—a rare incident of opium poisoning, which, however, occurred early in a case that I have elsewhere reported. The normal sleep of these birds is not nearly so profound as that of man; and, on the other hand, their motor nerve system enjoys the faculty of evolving an enormous amount of force, and, as compared to their cerebral manifestations, is far more prominent. It is possible that we may discover that equivalent doses may affect more profoundly, in the direction of stupor, the creature taking them in proportion as its cerebral development is greater and its brain more active. Such, at least, seems to be the probable conclusion from a general survey of the effects of morphia on various classes of animals; while, especially in mammals, it will, I think, be discovered that individual peculiarities come in to modify the result, as they never so distinctly or so frequently do in the lower grades of animal life.

I had suspected that the enormous respiratory apparatus of birds might have some share in protecting them from opiate poisons; and this may possibly be the case, but I may add that I have failed to make it sure by the aid of experiment. An elaborate series of nearly an hundred experiments were made, to discover whether oxygen gas would increase this protection, and whether a small percentage of carbonic acid in the air breathed would plainly destroy it, and cause to be fatal doses which are not otherwise lethal. The great labour thus expended failed to afford any other

than a negative result, and only left it clear to me that the inhalation of oxygen does not protect the system which has been attacked by morphia.

I have once again to repeat my thanks to my assistant, Mr. Landis, for the industry and accurate care with which he aided me in the conduct of this research.

ART. II.—*Amputation at the Knee-joint by Modified Lateral Flaps.* By STEPHEN SMITH, M.D., Surgeon to Bellevue Hospital, New York. (With three wood-cuts.)

AMPUTATION at the knee-joint may now be regarded as an established operation in surgery. The dangers which have hitherto surrounded it have all been dissipated by the well-directed labours of Markoe, of New York, and of Brinton, of Philadelphia. The recent elaborate papers of these surgeons prove that in every essential particular in which amputation at any point of the leg is justifiable, it is equally justifiable at the knee-joint. The advantages of any given amputation are determined by its safety to life, and the serviceableness of the stump. The statistics embodied in the papers referred to establish the fact that amputations at the knee-joint are as safe as amputations through the thigh. They also prove what is more important, viz., that amputations at the knee are less fatal than similar operations in the upper third of the leg.

There remains still the important question, What method of operation is preferable? Various and very diverse opinions are entertained by surgeons on this subject. The methods recommended and now practised are the long anterior and short posterior flaps, the lateral flaps, the circular, the long posterior flap with section of the condyles (*Syme*), and the long anterior flap with section of the condyles (*Carden*).

The opinions expressed by Markoe and Brinton, the latest writers on the subject of amputation at the knee-joint, and surgeons of large experience, are deserving of especial attention. Markoe says (*N. Y. Med. Journ.*, March, 1868, p. 515):—

"The mode of operative procedure is so frequently determined by the condition of the parts after the injury that, I doubt not, most surgeons will arrive at the same conclusions that have gradually forced themselves upon us, viz., that it is really of comparatively little consequence what particular method of cutting the flaps be adopted, provided only that enough integument be left amply and easily to cover the expanded extremity of the femur."

He has been inclined to give preference to a long anterior and short posterior flap, because a thicker and tougher covering is thereby secured to the condyles, the drainage is such as to prevent collections of pus, the

ligatures are brought out more directly, and the cicatrix is placed behind the swell of the condyles.

Brinton expresses nearly the same opinion and preference. He says (*Am. Journ. Med. Sci.*, April, 1868, p. 336):—

"The main indication in the disarticulation of the knee is to obtain a sufficient amount of integumental covering to admit of the lips of the wound being brought together without strain. Whether this be accomplished by the circular or oval method, or by the formation of lateral or of antero-posterior flaps, matters but little. The writer's experience inclines him to give the preference to the latter procedure."

Something more, we believe, is now required in this as well as in all other amputations of the lower extremity than the easy adjustment of the flaps at the time of the operation. In the first place, we cannot overlook the proper drainage of the stump during the process of healing. This can be effectually secured, and quite as effectually prevented, by the method of making the flaps. In the second place, it must be remembered that this stump is to receive direct pressure, in progression, from the artificial limb, and hence the necessity of carefully securing such flaps and their adjustment as will render the face of the stump firm and resisting. No stump can be regarded as well adapted to take direct support which is traversed by a cicatrix, and the position of the cicatrix will be determined by the method of operation adopted.

The method of amputation at the knee-joint has, therefore, a much more important bearing upon the immediate success of the operation, and the future usefulness of the limb, than the mere approximation of the flaps without strain. The question recurs, then, What method of forming a covering to the knee-stump will most effectually meet the two conditions above given, viz., thorough drainage, and such cicatrization as relieves the stump from pressure upon a cicatrix?

It may be affirmed of the antero-posterior flaps, as usually made, that they more effectually prevent drainage, and more certainly bring the cicatrix upon important parts of the face of the stump, than any other method of amputation adopted at the knee. When, however, the anterior flap is sufficiently long to allow the posterior flap to be nearly circular, the drainage is direct, and the cicatrix is posterior to the face of the stump. The danger is incurred of sloughing of the anterior flap, which must be made of great length, to cover the extremities of the condyles of the femur. The method by lateral flaps is even better adapted to drainage than that of the long anterior flap, and has the additional advantage of two moderately-sized and well-nourished flaps. But it fails to place the cicatrix beyond the seat of direct pressure on the anterior part of the stump. The circular and oval methods are less adapted to meet the conditions above given than those just described.

The methods of Syme and Carden, involving excision of the condyles,

are extremely objectionable, as well as entirely unnecessary, unless there is too little flap.

It is evident from this statement of the results of the different methods of operation that the long anterior flap and the lateral flaps combine the advantages which we seek, both in drainage and the position of the cicatrix, and yet each has certain disadvantages. In several recent amputations at the knee-joint I have endeavoured to combine the good features of the long anterior flap and the lateral flaps, without their objectionable points. The operation is performed as follows: The incision is commenced about one inch below the tubercle of the tibia, and carried downward and forward over the most prominent part of the side of the leg, until it reaches the under surface, when it is curved towards the median line. When that point is reached, it is continued directly upwards to the centre of the articulation. A second incision begins at the same point as the first, and pursues a similar direction upon the opposite side of the leg, and meets it in the median line on the posterior part. The line of incision upon one side is seen in Fig. 1. The following precautions should be remembered, viz., the incisions should incline moderately forwards down to the curve of the side of the leg, to secure ample covering for the condyles, and that upon the internal aspect should have additional fulness for the purpose of insuring sufficient flap for the internal condyle of the femur, which is longer and larger than the external. In the dissection, the skin, fascia, and cellular tissue are raised, and the ligamentum patellæ divided, allowing the patella to remain. The ligatures are all drawn out of the posterior angle of the flaps.

Fig. 1.

The appearance of the flaps immediately after disarticulation is seen in Fig. 2. It will be noticed that the extremity of the femur is already completely covered, and the line of union of the flaps will be between the condyles and over the inter-condyloid notch. When cicatrization is complete, the cicatrix sinks into this notch and disappears from the face of the stump, and offers no point of contact with the artificial appliance. The appearance of the stump on recovery is given in Fig. 3.

In the process of repair, it will be found that the drainage is so perfect that all the anterior portion of the wound remains dry, and frequently heals by immediate union. The dressing of this part of the wound often

need not be disturbed more than once or twice until cicatrization is complete.

Fig. 2.

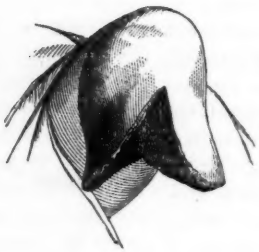

Fig. 3.

This method of amputation need not be limited to the knee. The advantages of drainage, and the removal of the cicatrix from the face of the stump to its posterior part, equally adapt it to amputation in the leg or thigh. I have frequently amputated at both of these points by this method, and obtained the most satisfactory results. The wound heals with remarkable rapidity, and the final perfection of the stump leaves all that can be desired. In Fig. 1 the line of incisions is given in amputation of the leg and thigh by this method. The incision on the posterior part of the leg should extend upwards to the point where the bone is to be sawn through, and there the muscles are divided circularly.

NEW YORK, Oct. 1869.

ART. III.—*A Contribution to the Knowledge of the Physiological Action of the Alkaloids, Viridia, Veratroidia, and Veratria of Commerce, and of the Resin of Veratrum Viride.* By HORATIO C. WOOD, Jr., M.D., Professor of Botany in the University of Pennsylvania. (Read before the Biological and Microscopical Section of the Academy of Natural Sciences, Nov. 1869, and recommended for publication.)

MR. CHARLES BULLOCK, of this city, in the *Proceedings of the American Pharmaceutical Association* for 1867, announced that he had finally completely worked out the chemistry of the *veratrum viride*, and described

two alkaloids, one soluble, the other insoluble in ether. With characteristic modesty, he did not assign names to these, but in the forthcoming edition of the *U. S. Dispensatory*, it is proposed to call the former *viridia*—the latter *veratroidia*. The present investigation was undertaken to establish if possible the physiological powers of these two alkaloids together with the resin associated with them, and was extended to a partial study of veratria of commerce by way of comparison.

As nothing definite has hitherto been published upon the toxic action of viridia and veratroidia, the first series of experiments was simple, merely tentative as it were, having for its object the study of the symptoms and the post-mortem changes induced by poisonous doses of the alkaloids.

Before detailing these experiments, I desire to express my obligations to Mr. Charles Bullock for preparing and giving me a supply of these alkaloids and the resin of veratrum viride, and to Dr. S. Weir Mitchell for assistance, without which I scarcely would have been able to have carried these experiments to a successful termination. I am greatly indebted to the latter for the loan of instruments, for the counsel of experience, for encouragement amidst difficulties of, to me, a novel line of research, all of which he, with the enthusiasm of a true love for science and humanity, has at all times most generously afforded, grudging not his own valuable time to aid another's efforts.

The preparations of the alkaloids worked with were always sulphates, made by dissolving the alkaloid itself in very dilute sulphuric acid until the solution was nearly neutral to test-paper. It is worthy of remark, that although such solutions were perfectly clear as first made, yet after a time they deposited a copious light flocculent sediment. The nature of this I was unable to determine, but it was probably some impurity with which the alkaloid was so closely united as to impart for awhile its own solubility to it, just as castor oil will cause a certain per cent. of another fixed oil to be soluble with it in alcohol. In using this solution the precipitate was mostly shaken up and the whole injected into the tissue of the animal. In some instances, in which the deposit was filtered out, I could perceive no difference in the effect on the animal.

Experiments with Viridiæ Sulphas.

Expt. 1.—Injected into the thigh of a young pigeon, gr. $\frac{1}{16}$th of viridiæ sulph.; heart beating 200. 12 *minutes.* Pigeon quieter; breathing labored; heart 144; pupils unchanged; some trembling. 1 *hour.* Pigeon as before injection, only quieter; injected in opposite thigh gr. ½ viridiæ sulph. 10 *minutes.* Violent tremblings, passing in a very few minutes into general convulsions, with loss of power; the limbs were unable to bear up the pigeon, so that it first sprawled, then fell forward and to one side, and finally lay on its back, still having convulsions; the heart's action was exceedingly rapid towards the last; no vomiting or purging; pupils unaffected, responding actively to light until moment of death.

Autopsy immediate.—Alimentary canal and appendages normal; heart firmly contracted; lungs congested; blood dark, coagulating rapidly; brain and spinal cord normal; no signs of irritation at points of puncture.

Expt. 2.—Young pigeon, injected gr. $\frac{1}{15}$ viridiæ sulph.; temperature 108°; heart's beats not noted. 10 *minutes.* Temperature 107°; heart's beats 120. 15 *minutes.* Pigeon quiet, indisposed to move; heart's beats 76; pupils natural. 30 *minutes.* Pigeon quiet, disposed to crawl into corners, lying flat on breast; temperature 107°; rapidity of heart's beat varying constantly; slightest movement or excitement of pigeon causing heart to beat so rapidly it cannot be counted. 80 *minutes.* Pigeon livelier; injected $\frac{1}{8}$ gr. into its breast. 10 *minutes.* Pigeon unable to stand firm and quiet, resting on whole length of leg, constantly flapping wings to keep the balance and changing feet, wants to get into corner. 15 *minutes.* Nervous twitchings of tail. 20 *minutes.* Evidences of convulsive movement marked. 22 *minutes.* Convulsions, with sprawling and inability to stand; falling backwards. 23 *minutes.* Wings flap vigorously, but without raising pigeon at all. 30 *minutes.* Convulsions marked with increasing weakness; motion backwards and sidewards. 33 *minutes.* Convulsions violent; no change in pupils; pigeon shows consciousness in trying to get into corners and dark places. 35 *minutes.* Convulsions very violent; now pitches forward all the time. 38 *minutes.* On back; still violent convulsions. 40 *minutes.* Pigeon died in hand.

Autopsy immediate.—Nothing abnormal.

Expt. 3.—Full grown white rabbit; injected into its thigh gr. $\frac{1}{7}$; breath rate 140; temperature 103° F.; no perceptible effect.

Expt. 4.—Same rabbit; injected gr. $\frac{1}{3}$; in 20 minutes no symptoms; repeated injection. 10 *minutes.* Great muscular tremors; acceleration of breathing; pupils natural; almost a tetanic appearance of hind legs, but when taken hold of legs not rigid; he moves with some difficulty. 15 *minutes.* More marked tremors with weakness; rabbit flat on belly; can't move himself on legs; no rigidity of muscles; loss of power of legs, almost complete in hind legs; certainly no loss of sight or hearing or feeling, apparently perfect consciousness. 20 *minutes.* Convulsions; not constant but repeated; rabbit squealing with them; no vomiting or purging; all legs sprawling; no marked change in pupils. 30 *minutes.* Still occasional convulsions with horrible squealing. 40 *minutes.* More violent convulsions now on side; has lost power of lifting up head, except in convulsions, which are gradually getting more feeble. 60 *minutes.* Still alive; relaxation more perfect. 90 *minutes.* Slime running from nostrils; all motion ceased save occasional twitchings and shudders; a small relaxed movement from bowels; no vomiting. 105 *minutes.* Dead.

Autopsy two hours after death.—Rigor mortis considerable; nervous and alimentary systems normal; lungs intensely congested, very dark, looking as though solid, though really crepitant; heart pretty full of blood.

Expt. 5.—Kitten 3 months old; injected about gr. $\frac{1}{3}$. 8 *minutes.* Tremblings. 10 *minutes.* Loss of power, most marked in hind legs; unable to lift itself; constant convulsive movements; injected gr. $\frac{1}{24}$ atropiæ sulph.; heart 120; 17 *minutes.* Same state. 23 *minutes.* Pupils widely dilated; heart 160. 25 *minutes.* All power lost; still convulsive twitchings; I now removed the sternum, no signs of pain; lungs immediately collapsed; heart beating actively continued (10 minutes) until it was removed from body, beat a few times spontaneously after this, and then responded actively to mechanical stimuli.

Remark.—The atropia produced no amelioration in symptoms.

Expt. 6.—Kitten about two months old; injected gr. $\frac{1}{8}$th viridiæ sulph. At time of injection heart-beat not perceptible, or at least sufficiently so to be counted. 20 *minutes.* Heart beating violently and tumultuously, heaving chest; 134 a minute. This was after a considerable exertion of the kitten—chasing it, &c. Up to this time only effect perceived was that kitten evidently wanted to be quiet. When it was kept quiet a little time, heart's action was found irregular and much weaker, but still apparently producing more external effect than before injection. 25 *minutes.* Tremblings very apparent; rocks from side to side in walking, uttering constantly feeble cries; moves slowly, with effort. 30 *minutes.* Lying flat on belly, with feet stretched out; but when pushed and

excited can walk, but with difficulty—peculiar sprawling, rocking gait. 35 *minutes.* Gave ⅛th gr. more. 40 *minutes.* Tremblings still more marked; very great loss of power, and tendency to convulsions. 45 *minutes.* Same; not able to raise itself on legs; no convulsions yet; heart beating tumultuously and irregularly; no impairment of consciousness. 50 *minutes.* Paralysis has been almost complete in hind legs; cat pulling itself round with fore legs; making a fixed point of hinder extremity; hind legs seem to have no power even in convulsive seizures; convulsions. 60 *minutes.* Cries and convulsions violent; in convulsions head erect; raised up on fore feet, but hind feet powerless; breathing laborious, panting, noisy. 65 *minutes.* Mouth open; continued with violent convulsions until about one and three-fourth hours, when kitten died. There was no vomiting or purging; consciousness perfect until very near death; heart continued beating a minute or so after respiration ceased.

Autopsy immediate.—Lungs not much congested; heart full of blood—retaining its irritability; venous system gorged with blood.

Expt. 7.—June 29. Injected ¼d gr. of sulphate of viridia into thigh of young, very small, terrier cur. Pulse 160. 8 *minutes.* Muscular tremors. 10 *minutes.* Pulse not different from first. 15 *minutes.* Heart acting somewhat irregularly, 116; accelerated, when muscular tremors now marked come on. 18 *minutes.* Pulse 108; respirations irregular and so lost in convulsive seizures that I cannot satisfactorily count them. 22 *minutes.* Pulse 110; heart beat very strong and full to fingers; animal urinating. 25 *minutes.* Pulse 105; muscular tremors marked. 27 *minutes.* Pulse 108. Allowing dog to be untied almost unable to raise himself on hind legs; lies flat upon his belly; can only make a few steps when aroused. 30 *minutes.* Pulse 102; beating him does not make him get up; but he still has pretty good power in front legs—much more than in hind. 35 *minutes.* Pulse 90. 40 *minutes.* Pulse 86. 50 *minutes.* Pulse 75; no convulsions yet. 60 *minutes.* Pulse 70; dog very weak, with but slight tremors; eyes disposed to be shut and head to fall to one side. 70 *minutes.* Pulse 72; tremors almost entirely ceased; no vomiting or purging yet. Injected gr. ¼d of the alkaloid in peritoneal cavity. Tremblings recommenced in three minutes. 75 *minutes.* Pulse 104; dog howling a little; restless; trying to walk. 87 *minutes.* Injected gr. ⅛th into femoral vein. 90 *minutes.* Convulsion; dog growling, trying to bite; frothing at the mouth; violent, almost tetanic urination; dog sprawling, unable to get up on legs even in convulsions. Pulse under convulsions rising to 140. 120 *minutes.* No marked change, except breathing has become panting, with tongue hanging out. There is certainly great loss of sensation. 200 *minutes.* Dog lying on its side; heart pulsations 200; constant violent convulsions; there has been profuse salivation; everything about head wet. 230 *minutes.* No marked change except dog weaker; injected gr. ¼d into peritoneal cavity; dog perfectly conscious; when one pokes him in side with stick or finger tries to bite. 260 *minutes.* Heart very irregular, beating 70 a minute and then running up to 120; no change except increasing weakness. 290 *minutes.* Injected gr. ¼d into peritoneal cavity; animal almost immediately was attacked with wild convulsions, and in a few minutes was evidently dying; heart acting tumultuously and irregularly, frequently stopping for time of several beats; respiration ceased, however, some five minutes before heart.

Autopsy five minutes after cessation of respiration.—Heart congested on right side; left not markedly so; still preserving irritability; venous system engorged with very dark blood. Intestines—vermicular motion very distinct and active; no lesion detected; spinal cord and membrane very pale; as also the brain and its membranes.

Expt. 8.—Snapper (*Chelydra Serpentina*) of moderate size. Exposed heart; beats 32 a minute; injected into pericardial sac gr. ⅛th viridiæ sulph. 5 *minutes.* Heart 32. 15 *minutes.* Heart 20. 20 *minutes.* Heart 20; injected gr. ¼d into thigh. 25 *minutes.* Heart 28. 45 *minutes.* Same. 60 *minutes.* Same; injected into pericardial sac gr. ⅛th; in 5 *minutes,* heart 22; 10 *minutes,* same; 15 *minutes,* heart 28.

Expt. 9.—Large toad (*Bufo Americanus*). Gave gr. ¼d viridiæ sulph. 3 *min-*

utes. Absolutely paralyzed all over; no convulsions or convulsive twitchings. 15 *minutes.* Dead. This experiment was repeated upon another toad with similar results.

Experiments with Veratroidiæ Sulphas.

Expt. 10.—Injected into breast of pigeon gr. $\frac{1}{12}$th veratroidiæ sulph. Pulse 200; seems to be some irritation at point of injection. 20 *minutes.* No decided symptoms; gave gr. $\frac{1}{8}$th additional. 35 *minutes.* Pigeon quiet; legs weak; sprawling, hardly able to bear him up. Heart beating irregularly; for a few beats at the rate of 60 a minute; on least exertion going off with a whirr, so that the ear could not follow it. Pigeon very weak; trembling; not so much of convulsive thrill as in viridia poisoning. 70 *minutes.* Pigeon weak; can't maintain itself well on legs; no convulsions or twitchings. 120 *minutes.* Pigeon convalescent.

Expt. 11.—Pigeon; injected in breast gr. $\frac{1}{8}$d veratroidiæ sulph.: injections seemed to create local uneasiness; pigeon picking at the wound. 10 *minutes.* Pigeon very alert, but seems a little weak, and trembling; wants to be quiet, but constantly peering about. 12 *minutes.* Legs getting weak. 15 *minutes.* Pigeon apparently greatly alarmed; legs hardly able to sustain it; vomiting. 20 *minutes.* Pigeon vomiting and purging; weak; convulsed, with wings flapping, tail widely extended, but yet unable to raise itself upon its feet—constantly sitting flat on its leg. 25 *minutes.* Convulsions constant; not accompanied by constant muscular thrill of viridia, but more jerking; pigeon pushing himself forward in them; consciousness perfect; pupils not affected. 30 *minutes.* No vomiting or purging for ten minutes; convulsions very violent, driving pigeon rapidly forward as he lays on breast—uttering cries. 45 *minutes.* No more vomiting or purging; pigeon on back; still convulsed; some muscular thrills; heart beating so fast cannot count it. 60 *minutes.* No change except increased weakness. 70 *minutes.* Dead.

Expt. 12.—Dog, with paralysis of hind legs from spinal injury. Gave gr. $1\frac{1}{2}$ veratroidiæ sulph. Dead in fifteen minutes, with vomiting and slight purging.

Expt. 13.—A very large, old, male English rabbit. Cut pneumogastrics; respirations immediately went down from 120 to 76 a minute, and became laboured. 10 *min.* Respiration 80; injected gr. $\frac{1}{8}$ veratroidæ sulph. 35 *min.* Respiration 54. 1 *hour and a half.* Injected gr. $1\frac{1}{2}$ veratroidiæ sulph. 5 *min.* Breathing about same, but irregular. 35 *min.* Rabbit weak, with convulsive tremblings. 40 *min.* Rabbit convulsed, not very violently; no muscular thrill. 43 *min.* Rabbit convulsed violently. 45 *min.* Rabbit dead. Respiration ceased a little before heart. No vomiting or purging.

Autopsy two hours after death.—Venous system congested; lungs full of dark blood, crepitant; no ecchymoses; cerebro-spinal axis normal.

So many experiments on various animals with the veratria of commerce have been long since published, that I relate two experiments only from my note-book for comparison with those just detailed. It may be well, however, to state, that although purging is often spoken of as a constant result of a poisonous dose of veratria given hypodermically, yet my experience proves that it is merely an habitual result, and not very unfrequently does not occur. Vomiting I have never known to be absent.

Experiments with Veratriæ Sulphas.

Expt. 14.—A dog, weak from previous experiment, was injected July 22, with veratriæ sulph. gr. $\frac{1}{3}$. 5 *min.* Dog very restless, showing marked signs of local suffering at point of puncture, licking and nosing it. 10 *min.* Dog vomiting. 15 *min.* Dog still sick at stomach, urinating freely and constantly.

20 *min.* Dog purging; no tremors or convulsions. 40 *min.* Injected gr. ⅔ additional. 60 *min.* Dog purging violently; some convulsions, but not violent or universal, nor associated with general muscular thrills. 80 *min.* Dog dead; respiration ceased ten minutes before heart, which retained its irritability.

Autopsy.—Right side of heart congested; whole venous system full of black blood, highly congested. Stomach—mucous membrane congested. Small intestines—mucous membrane slightly congested; not so much as that of stomach.

Expt. 15.—Pigeon. Injected gr. ½ veratriæ sulph. A slight convulsion; in two minutes dead of universal paralysis.

When a poisonous dose of viridia, or one of its salts, is injected into the cellular tissue of a warm-blooded animal, the first symptom manifested is a desire to be quiet, often a tendency to creep into corners and hide there; an unnatural sluggishness when approached. The whole expression of the face and form shows that this is not cerebral in its origin; the eye is bright, and all ordinary signs of consciousness perfect. The quietness is evidently dependent upon a condition of weakness, which makes movement a painful effort. The next new symptom is, in most cases, the accession of tremblings. These are, at first, slight, scarcely perceptible; but by and by become more apparent. They are accompanied by a great increase of the weakness, the animal often becoming restless from the constant efforts to keep upon its feet. This weakness is certainly, in most cases, more marked in quadrupeds in the hind than the front extremities; in birds in the *legs* than wings. The trembling at first may possibly be due to muscular weakness, but soon it is evidently peculiar; and if the hand be laid on the animal, all the muscles will be found to be in a sort of peristaltic contraction, which runs, as it were, from fibril to fibril, and causes a peculiar, rapidly-repeated thrill. I have never seen this in animals affected with any other poison, nor in the human subject. It is, I think, characteristic of the action of viridia, and is rarely if ever absent.

The next stage is marked by the supervention of convulsions. These are often quite violent. In them a rabbit will run around the room apparently in great pain, or at least squealing violently. They are characterized by clonic spasm of the muscles, and a great absence of real as compared with apparent power. The wings of the pigeon will flap rapidly, and to the eye with great force, and yet fail to raise the body at all. The rabbit, running and squealing, drags his belly on the ground. If one takes hold of the convulsed limb, he finds how little is the force exerted by the muscle, even when apparently in intensest spasm. These convulsions generally continue until death, combined with ever-increasing weakness. The pigeon soon merely drives itself forward in them on its breast. The rabbit painfully progresses lying on its belly, its hind feet, perchance, extended and powerless. Then, no longer able to maintain even this position, the animal lies on its side, and finally, in many cases, on its back, till death puts an end to its sufferings. Consciousness is preserved until the last. Sensibility appears to be unchanged for a time, and then be-

numbed, but not destroyed. In this respect I have thought there was a difference in different animals.

The above course of symptoms is very constant in mammalia and birds, but in reptiles, the convulsions are not nearly so marked, and in some instances are wanting. There is never any vomiting or purging, but frequently, and probably always, profuse salivation. The eyes are unaffected throughout.

The first question which naturally presents itself in this investigation is, how does viridia cause death? through the respiratory system, the heart, or the brain? It is very evident that it is not by any cerebral action. It must be either through the respiratory or circulatory system. A reference to Experiments 4, 5, and 6, will show that the heart continues beating after the cessation of respiration; and the experiments made after this first series and hereafter detailed, confirm this. Death takes place from asphyxia—the result of a failure of the muscles of respiration.

The *post-mortem* appearances give no positive evidence as to the way in which the drug acts, but the total absence of all signs of active irritation of the nervous system, confirms the indication of the peculiar forms of the convulsions and the weakness during life, that its action is one of sedation and not of stimulation.

The action of *veratroidia* and its salts on animals is very different from that of viridia, resembling more nearly that of veratria. There are fewer convulsions than when the former alkaloid is used, and the peculiar muscular thrill is absent. Vomiting is always present and severe, and there is generally purging. Death is produced by a loss of power of the respiratory muscles. Although the physiological action of veratroidia is so similar to that of veratria, it apparently differs from it, very greatly, in its toxic power. Thus in experiment 11 it required 70 minutes for a $\frac{1}{3}$d of a grain of sulphate of veratroidia to kill a pigeon, whilst the same amount of sulphate of veratria in experiment 15 caused death in two minutes. That the veratrum viride alkaloids worked with were not absolutely pure is, however, certain; but Mr. Bullock assures me they were practically so, that the small amount of impurity contained was not enough to affect the dose.

In regard to the local effect of the injection of these alkaloids, when the sulphate of veratria was employed, there were always evident signs of local pain; when the sulphate of veratroidia was the drug, these signs were much less apparent, and I have never seen the sulphate of viridia produce appreciable irritation.

Second Series of Experiments.—This series was undertaken to discover, first, what was the real action of the alkaloids upon the circulation, and, secondly, in what manner such action was affected; whether by virtue of their influence upon the spinal centres, or independent of it.

The experiments were as follows :—

Expt. 16.—Cur dog of moderate size. Bernard's cardiometer was inserted into the femoral artery. The mercury varied from 120–160 m., rising when the dog struggled to 190 m. ½ gr. viridiæ sulph. was injected into thigh. 15 *minutes.* Maximum heart force, 120 millimetres. 20 *minutes.* Dog perfectly passive; heart force 65–95 m., varying greatly, mercury often staying for some time from 65–75, then slowly creeping up, then falling; individual beat only 1–5 c. 30 *minutes.* Heart force 65–75 m.; individual beat same. Pulse 68; respiration forced and labored. 40 *minutes.* Injected gr. ½ viridiæ sulph. into peritoneal cavity. 45 *minutes.* Short, violent convulsion, under whose influence heart force went to 125 m., dropping, after a few beats, to 100 m., and then ranging from 75–100 m.; in a little while after cessation of convulsion settling down at 75 m. 60 *minutes.* Dog quiet, no more convulsions. 75 *minutes.* Gave gr. 1 viridiæ sulph., hypodermically. 3½ P. M. Dog weak but able to walk; trembling all over. 4 P. M. Gave gr. 1 viridiæ sulph. hypodermically, making 3 grains in all. The next day dog pretty well.

Expt. 17.—I exposed the pneumogastrics and femoral artery, under ether, in a powerful, very thick-necked Scotch terrier. 11.30 A. M. Placed Bernard's cardiometer *en rapport* with the femoral artery. Arterial pressure 120–130 millimetres; heart force (single beat) 5–10 m. Pulse 186; gave, hypodermically, gr. 1½ viridiæ sulph. 11.35. Arterial pressure 115–125 m.; heart force 5–10 m. 11.40. Pulse 160; arterial pressure 110–120 m.; dog quiet. 11.45. Pulse 128. 11.55. Pulse 80; arterial pressure, when dog is quiet, 85–105 m., going to 120 m. when dog struggles. I now attempted to cut the pneumogastrics. In doing this on the left side, the carotid was cut instead of the nerve, and there was a profuse gush of blood, which, however, ceased in a moment or two spontaneously, aided only by pressure on the outside of the neck. The left pneumogastric was not cut. 12 noon. Arterial pressure 60–70, going up to 100 m. when dog struggles. Pulse 92. 12.5 P. M. Pulse 92; arterial pressure 85–88 m. 12.8. Pulse 92; arterial pressure 80–85 m., going up to 100 m., when dog struggles. 12.15. Pulse 80; arterial pressure 75–80 m., going up to 90 m. when dog struggles. An attempt was now made to kill the dog by cutting the femoral artery at Poupart's ligament. The bleeding, however, ceased spontaneously in a very little while without seriously affecting the dog. The force of the circulation had been so greatly lowered by the alkaloid, that there was spontaneous arrest of hemorrhage in both carotid and femoral artery, without dangerous loss of blood.

Expt. 18.—Inserted Bernard's cardiometer in a moderate sized mongrel dog. Pulse 108; arterial pressure mostly 120–150 m., going down rarely to 110 m., and up to 160 m. 3.15 P. M. Injected gr. 1 veratroidiæ sulph. into peritoneal cavity. 3.20. Dog has active movements, which may be voluntary or may be of the nature of convulsions. Pulse 106; arterial pressure 55–80 m., going up to 95 m. infrequently. 3.22. Dog vomiting violently; a convulsion. 3.25. Dog unconscious; apparently dead, with no perceptible breathing for two minutes; then a half dozen howling, laborious breaths; then quiet. Pulse 30; arterial force 110–150 m., going up to 160 m., the individual beats of the heart greatly exceeding in power anything I have ever witnessed, driving the mercury through 40 m. 3.30. There has been no perceptible breathing for five minutes, except a paroxysm of a half dozen convulsive breathings; during this time pulse rose to 140; most of the time the arterial pressure ranged from 175 to 195 m.; at one time rising to 210 m. The individual beats were very powerful, but nothing like what they had been. 3.31. Mercury fell in cardiometer tube almost instantly; motion ceased; dog dead.

Autopsy.—Brain and medulla congested with dark blood; right side of heart enormously swollen and congested; left side nearly normal; venous system everywhere gorged; blood very dark.

Expt. 19.—Inserted Bernard's cardiometer in femoral artery of a terrier dog; pulse 112; arterial pressure 120–160 millimeters. 11.10 A. M. Gave, hypodermically, gr. ss veratroidiæ sulph. in thigh. 11.15. Arterial pressure 120–160 m.

Pulse 112. 11.20. Arterial pressure 75–90 m., rarely going up to 95 m. Pulse 104. Dog quiet. 11.25. Arterial pressure 75–90 m. Pulse 84. 11.27. Dog vomiting violently. 11.30. Arterial pressure 90–105 m. Pulse 68. Dog vomiting pretty constantly; no convulsions; some very slight twitchings of muscles; no purging. 11.40. Arterial pressure 90–105 m. Pulse 76; some convulsive movements. 11.45. Arterial pressure 110–120 m., going up to 125 m. Dog quiet; not vomiting (hence probably arterial pressure increased). 11.50. Severe paroxysm of vomiting; immediately after this arterial pressure 70–90 m. Pulse 96. In a few seconds arterial pressure 90 to 105 m.; then in a little longer 115–120 m., falling occasionally to 110 m., and going up sometimes to 125 m. Strong opisthotonic convulsions then came on, directly after which arterial pressure fell to 90–105 m. 11.55. Dog quiet; pulse 142; arterial pressure 115–120 m., falling rarely to 110 c., and rising to 130 m. 12 noon. Pulse 140; arterial pressure 100–115 m., going to 130 m. rarely. 12.03. Unfastened dog, pushed him off the table, and he fell as relaxed and stone-like as though dead, but in a little while strove to get up, and, struggling violently, slowly progressed forward, scarcely however raising his belly from the ground. I seized him, and was placing him on the table when he had an extremely violent, persistent convulsion, followed by total unconsciousness, so that touching his glazed eyeball with the finger did not cause closure of the lid. Breathing had apparently ceased; pulse very feeble and irregular. Lying quiet on the table, however, consciousness gradually came back, and the normal sensitiveness returned to his eye. 12.15. Dog breathing well again; pulse 104; arterial pressure 155 to 175 m., going up to 180 m. 12.30. Dog perfectly quiet; not moved for fifteen minutes; breathing regular; pulse 104; arterial pressure 95–105 m., going up to 130 m. Gave gr. ss veratroidiæ sulph. in peritoneum. Dog showed no signs of life when struck or hit. 12.35. Arterial pressure 80–90 m., going up to 105 m. 12.40. Dog vomiting again. 12.45. Dog quiet; pulse 108; arterial pressure 105–115 m., going up to 120 m. 1. Pulse 104; arterial pressure 90 to 95 m., going up to 100 m. The dog was now untied and allowed to lie quietly until he died, some time afterwards.

Expt. 20.—Stout poodle dog. 3.50 P. M. Connected cardiometer with right femoral artery; pulse 160; arterial pressure going up to 130 m.; at times as low as 90 m., generally above 115 m.; single beat mostly 8 m. 4. Gave hypodermically veratriæ sulph. gr. ¼. 4.05. Dog struggling, showing marked signs of suffering; howling: breathing, panting, violent: pulse 160: arterial pressure up to 140 m. 4.10. Pulse 155; arterial pressure ranging from 80 to 110 m., mostly below 100 m. Dog strong—howling. 4.15. Dog vomiting—matter vomited greenish. 4.25. Dog vomiting. 4.33. Dog still vomiting; pulse 96; arterial pressure going as low as 50 and up to 90 m., mostly from 60–80 m. 4.36. Gave hypodermically grain ⅛ veratriæ sulph. Slight convulsive tremors and paralysis. 4.45. Dog quiet; paralyzed all over; constant tendency to vomit; no purging. 4.50. Pulse 72; still making efforts to vomit; very weak. 5.15. Dog dead; no purging whatever.

Expt. 21.—Small cur dog. Exposed pneumogastric nerves and placed cardiometer in femoral artery; pulse 168; arterial pressure 150–158 m.; cut pneumogastrics, and waited for a considerable time; arterial pressure 146–152 m.; heart force (single beat) 4–5 m.; pulse 184. 5 P. M. Gave gr. 1½ viridiæ sulph. 5.15. Heart force 4–5 m.; arterial pressure, lowest point, between inspirations 115, playing up during extreme struggle and respiratory effort 165 m. 5.25. Pulse 72; arterial pressure falling to 70 m., rising under extreme struggles to get loose, and respiratory effort to 105 m.; during quiescence generally to 80–90 m.; heart beat 10 m. 5.30. Pulse 80, somewhat irregular in frequency; arterial pressure going down to 65 m., under effort up to 95 m. Dog constantly struggling, puffing, with apparently convulsive tremors. 5.45. Pulse 76; arterial pressure as low as 45 m., going up to 75 m. when dog struggles; mostly 50–60 m. 6 P. M. Pulse 68; arterial pressure down to 38 m., going up to 60 m. under struggles; heart force 8 m. The dog was now let up from the table and allowed to go free; died during the evening.

Expt. 22.—Youngish mongrel hound of moderate size. 11.10. Cut pneumogastrics; connected cardiometer with femoral artery; arterial pressure 110–120 m.; pulse 176. 11.15. Gave hypodermically grain 1 viridiæ sulph. 11.20. Pulse 172. 11.25. Pulse 176. 11.30. Pulse 164; arterial pressure mostly from 110–115 m., going up to 135 m. in struggles, and down to 90 m. between inspirations, when very far apart. 11.35. Pulse 140. 11.40. Pulse 80; arterial pressure 75–95 m.; when dog struggles going up to 105 m.; occasionally going as low as 70 m. 11.45. Pulse 76. 11.50. Pulse 76; arterial pressure mostly 65–85 m., going up to 105 m. during struggles, and at times as low as 55 m. Convulsive tremors have commenced, moving along muscles very markedly. 12 noon. Pulse 76; very marked convulsive tremors, almost amounting to convulsions. 12.10. Dog in constant violent convulsive tremors, actually shaking the table, succeeding one another constantly, only interrupted by convulsions. Pulse 76; arterial pressure mostly from 65–90 m.; under influence of stronger convulsions up to 110 m.; once, when tremors interrupted for five or six seconds, going down to 50 m. 12.25. General state of dog the same, only convulsions more pronounced; pulse 76, somewhat irregular; arterial pressure 55–75 m., going up to 95 m. under strong convulsions, and when very strong to 100 m.; this rare, not so often as before. 12.40. Convulsions now so violent and constant cannot count pulse; femoral artery obstructed; gave hypodermically gr. ½ veratriæ sulph. 1.10 Dog dead; thirty minutes after injection of veratriæ sulphas; no vomiting or purging.

Expt. 23.—10 A. M. Cut pneumogastric nerve in a small Scotch terrier. 11. Inserted cardiometer. Pulse 132. Arterial pressure 140–150 m.; going up to 165 m. Gave hypodermically, gr. ½ veratroidiæ sulph. There were no signs of local irritation. 11.5. Pulse 128; arterial pressure 130–140 m. 11.10. Dog quiet; pulse 128; arterial pressure 110–120 m., rarely going up to 125 m. 11.15. Dog quiet; pulse 128; arterial pressure 105–110 m., rarely going up to 115 m. 11.23. Pulse 128; arterial pressure 103–107 m., going to 112 m., once to 115 m. Dog quiet, conscious, apparently easy. 11.30. Gave gr. ½ veratroidiæ sulph. 11.35. Pulse 128. When the cardiometer was first connected with the artery the dog was quiet, and the mercury vibrated from 105–110 m.; directly dog was seized with a sort of convulsive paroxysm, growling fiercely, and struggling violently; after this passed off mercury fell to 75 m., finally settling at 80–95 m. 11.45. Pulse 144; arterial pressure, at first 75 m., going up to 95 m., where the blood coagulated; individual beats much weaker than at first. 11.50. Let dog off table; perfectly conscious, tries to get up, but his legs cannot support him. Has no real complete convulsions, but fits of growling, and starting, and efforts to move, probably of that character. Lies on his belly, with head remarkably erect; hairs bristling, but eyes heavy and expressionless. No vomiting or purging. Gave gr. ½ veratroidiæ sulph. hypodermically. 12.30. Dog quiet. Dog died some hour or so afterwards of exhaustion; no vomiting or purging; no new symptoms, simply grew weaker and weaker.

Expt. 24.—Cut the pneumogastrics of a good-sized Scotch terrier, and inserted the cardiometer after lapse of half hour or so. 3.45 P. M. Pulse 172; arterial pressure mostly 152–160 m., going up to 165 m., rarely down to 125 m. Gave, by hypodermic injection, 7½ drops of a solution of veratriæ sulph., of the strength of 2 grains to the fluidrachm. Dog seemed immediately to be in great pain, and much excited thereby. 3.50 Pulse 180; arterial pressure as before; dog quiet. 3.55. Pulse 200; arterial pressure mostly from 110–120 m., going up on violent inspiratory effort to 160 m., once down to 90 m. after a prolonged expiration. Dog frothing greatly from the mouth, but not purging or vomiting. 4.5. Pulse 200; arterial pressure mostly from 120–135 m., going up to 150 m. on inspiratory effort. 4.10. Pulse 200; arterial pressure 135–145 m., going to 155 m. on struggling. 4.15. Gave, hypodermically, gr. ½ veratriæ sulph. 4.20. Pulse 200; arterial pressure mostly 140–155 m., blood going up at one time to 170 m., where it clotted. 5.30. Pulse 200; arterial pressure from 155–170 m. 5.40. Dog dead; no convulsions at any time, although there were some convulsive twitchings of the muscles; no vomiting or purging.

Five minutes after death, heart not irritable; vermicular movements of intestines active.

Expt. 25.—Cut pneumogastrics of a stout poodle dog after waiting some time. Pulse 204; arterial pressure mostly from 160–165 m., going up to 180 m. on strong inspiratory efforts, and down to 140 occasionally. Injected into cellular tissue of side gr. ½ veratriæ sulph. 2 *minutes.* Pulse 206; arterial pressure 160–170 m., going to 125 m. on inspiratory effort, and going down at times to 140 m. 4 *minutes.* Pulse 196; dog breathing with difficulty and somewhat convulsed; one formed passage. 8 *minutes.* Pulse 212; placing cardiometer in artery blood went up immediately to 205 and there clotted. No vomiting. 15 *minutes.* Dog dead; respiration ceased before the heart's action.

Autopsy immediate.—Muscular irritability under the scalpel very marked, the muscles constantly quivering and shrinking as they were cut. All the vein trunks engorged; blood very dark; lungs intensely congested, dusky pink; abdominal cavity and contents normal; brain and spinal cord, sinuses and large veins choked with black blood; all smaller veins in same state, making the passively congested nerve substances very dark on section.

Remarks.—The experiments 16 and 17 show the action of viridia upon the circulation. There was a very marked reduction, both in force and rapidity of movement of the blood, associated with and perhaps dependent upon a great reduction in the rapidity of the heart's action. The force of the individual beat of the heart is at first, I believe, not much affected, it retaining its pristine power for some time after there is a very marked decrease in the general arterial pressure and the number per minute of the cardiac beats. Finally, however, there is also a loss of power in the single beat.

The next question which suggested itself in this connection was, is this reduction dependent upon an influence exerted upon the cerebro-spinal centres, or by some action on the heart itself, its muscular structure, or the sympathetic nerve ganglia contained therein. To answer this, experiments 21 and 22 were undertaken. In these the pneumogastric nerves were cut, and thus all direct connection between the heart and cerebro-spinal axis severed. When the agitation of the operation had subsided, the pulse and arterial pressure were noted, and the sulphate of viridia administered. The same results followed as though the pneumogastrics were entire. This is confirmed by the circumstance noticed in the experiment upon the snapper. The insusceptibility of these reptiles to poison is proverbial, and accordingly no dose of viridia, which I was willing to spare from my little store, injected into the thigh, produced any very apparent result; whereas, several times, a small quantity placed in immediate contact with the organ rapidly caused it to lessen its activity.

The action of veratroidia on the heart seems more difficult of interpretation. In experiment 18 there was a marked depression in the force and rapidity of the blood movement lasting for 10 minutes. At the end of this time, death by asphyxia was rapidly produced, and the circulation underwent a curious change. The pulse in a moment was reduced to a minimum in rapidity, but the individual beat became endowed with four times its normal force; the pulse then rapidly rose to 140—twenty beats be-

yond its pristine number, the individual heart contractions becoming much more normal, but the arterial pressure rising far above what it had been before the administration of the drug. Then very rapidly the mercury fell, and in a moment the heart was stopped and all was over.

I think the most probable explanation of this curious phenomenon is to be looked for in the sudden cessation of the respirations, and consequent rapid production of asphyxia. The increase in the force and rapidity of the heart's action were most probably due to the overpowering of the specific action of the veratroidia by that of the carbonized blood.

In his admirable *Physiological, Pathological, and Anatomical Researches* (p. 33), Dr. Reid has a paper upon the phenomena of asphyxia, from which the following is extracted:—

"When the animal was breathing freely through the tube in the trachea, was quiescent and, when the blood was fully arterialized, the range of level in the mercury in the tube seldom exceeded half an inch, sometimes not so much. When the stopcock was shut no change took place in the range of the mercury during the first half minute; generally, before the end of the first minute the animal had begun to struggle, and then the range greatly increased—rising during each attempt at expiration, and during the struggling of the animal. In some of the experiments the range of the mercury amounted to about nine inches, and in one experiment to ten inches."

"In a third experiment, the pulse was 100 before the stopcock was turned; at the end of one minute the blood was getting dark, the animal had begun to struggle, and the pulse was 120. During the second minute it struggled violently, and the pulse could not be reckoned. At the end of 2½ minutes the animal ceased to struggle, the respirations were few and heaving, and the pulse was 78."

In Experiment 19, the primary period of depression ended in a gradual increase in the frequency and force of the pulse, which had risen to 140 instead of 112 a minute, the number before its administration, but had not quite regained the force which it had had previous to the use of the drug, when a period of collapse and apparent death came on. After reaction from this, however, the circulation more than regained the power which it had at first. A further dose of veratroidia was followed by the same depression and subsequent rebound of the circulation. The indications do not in this case point so clearly to the accumulating carbonic acid as the cause of the secondary arterial excitement, but I cannot help believing it has something to do with the latter.

Experiment 23 was undertaken to discover whether the action of veratroidia on the heart is exerted through the pneumogastrics or not. It is much to be regretted that the small quantity of the alkaloid in my possession limited me to a single experiment. The first period of depression was, however, very well pronounced, and leaves no doubt but that the veratroidia produces this effect by direct action on the heart or its sympathetic ganglia. There was subsequent increase in the rapidity but none in the force of the circulation, when the cardiometer became disarranged. It is,

therefore, left uncertain whether the secondary exaltation is produced through the spinal nerves or not.

Sulphate of veratria depresses the circulation both in force and frequency, but not nearly so much as viridia, at least without the production of other violent and distressing symptoms. The depression is constant; constantly increasing until death. Experiments 24 and 25 show that this action must be through the spinal nervous system by means of the pneumogastric nerves. Veratria acting apparently as a direct excitant to the heart when the connection of the latter with the spinal system is severed. The suggestion naturally presents itself, is this increase owing to the action of the veratria or to the accumulation of carbonic acid in the blood. Further experiments will be necessary before this question can be positively answered, but the fact that the increase in the rapidity and force of the pulse commences almost simultaneously with the absorption of the alkaloid indicates that the latter is the immediate cause of the increased arterial action; that the veratria is either a direct irritant to unstriped muscular fibre or to the nervous cells contained in the heart structure.

The next point to which inquiry was directed, was to *whether the paralysis produced by viridia and veratroidia was due to action on the nerve-centres—on the connecting nerves or on the nerves themselves.*

Expt. 26.—*Rana fontinalis*—calico frog—adult. Injected gr. ½ viridiæ sulph. at 9.50 A. M. 9.55. Frog bellowing at intervals; making great efforts, cannot say whether voluntary or convulsive. 10. Mostly quiet; lays on side, with occasional great convulsive leaps. 10.3. Apparently paralyzed; crying; with convulsive motions, but perfectly motionless and relaxed when lifted out of water. 10.5. Almost dead. Eyes scarcely close when touched by probe; no signs of sensation when cut or touched. Crural nerve exposed; when pinched, violent spasm of leg; when placed on a silver probe and one end of steel forceps touched to it and the other to probe, the exceedingly slight galvanic current sufficient to produce violent spasm of leg; once a general convulsion seemed to be produced, probably an accidental coincidence, as could not be produced again. 10.10. Reviving. 10.13. Livelier; gave gr. ⅛ additional. 10.20. No signs of life for 15 minutes; muscles of leg still respond actively to irritation of nerve. 10.25. Spinal marrow, irritation of it by a point gives rise to some *faint* twitchings in leg muscles; no amount of irritation produces motion elsewhere or more pronounced. 10.30. Crural nerve still very excitable. Opened thorax, heart beating 50 a minute; no other signs of life. 10.35. Powerful irritation of spinal cord produces still slight twitchings.

Expt. 27.—*Rana fontinalis*—calico frog—adult, but small. 8.8 P. M. Respirations 68 per minute; injected gr. ½ viridia sulph. 8.12. Some rigidity. 8.20. Respirations 36, irregular. Consciousness perfect, but frog quiet; moves with great difficulty, unable to leap; sensibility apparently slightly affected; some rigidity. 8.22. Sensibility very imperfect. 8.25. Frog quiet, with an occasional apparently convulsive kick. 8.30. Exposed crural nerve; very faint galvanic current elicited active convulsions in limb; a very powerful one failed to produce any movements in other parts of the body. 8.35. Respiration 32, very irregular. 8.40. Sensibility totally abolished, also power of motion. 8.45. Excitation of spinal cord by a moderate current produces marked but not violent, general, diffused, muscular contractions. 8.50. Feeble galvanic current to crural nerve produces contractions in the limb, but no amount of stimulus

produces contractions elsewhere. 8.52. Exposed heart, which stopped beating at 8.57. After death muscular irritability perfect.

Expt. 28.—A large bullfrog—*Rana pipiens*—gave hypodermically gr. ¼ viridiæ sulph.; waited some time without apparent effect. 4.15 P.M. Gave gr. ½ additional. 4.20. Frog lies quiet in water, not disturbed so readily. 4.23. On taking out of water, very weak and relaxed; on ground cannot spring half his regular distance, and falls heavily upon the ground. 4.25. Almost lost power of jumping; lies flat on his belly; when placed in water not able to keep his nose above it, save by constant struggling. 4.30. Very weak; muscles relaxed, flaccid. at times, however, becoming rigid; in a sort of clonic spasm, which would affect only certain muscles of one limb for a minute or so, and then would leave there and appear in another limb; no marked convulsions. 4.40. Frog so relaxed that when placed upon the back in water lies there, or very slowly rolls over. Exposed to sight crural nerve; placing it on a silver probe and applying one point of moist steel forceps to nerve, another to the probe a little distance off, the very feeble galvanic current was sufficient to cause active contractions of the muscles. 5 P. M. Frog lost all power of motion, except some slight convulsive sudden extensions of single limb. Left crural nerve as excitable as the right had been; muscles responding actively to steel forceps and silver probe.

Expt. 29.—Small calico frog—*Rana fontinalis.* 4.45 P. M. Gave hypodermically in left thigh gr. ¼ of sulphate of veratroidiæ. 4.48. Frog disposed to be quick; when pricked with needle jumps pretty well; left thigh extended and somewhat rigid. 4.55. Frog cannot spring or lift himself. 5 P. M. When laid on back frog cannot right himself. Galvanization of crural nerve causes vigorous contractions of muscles of legs; no signs of pain when cut. 5.15. All voluntary motion has been suspended for some time; muscles move powerfully when galvanized some, but less so when crural nerves are galvanized, owing, probably, to previous exposure and repeated galvanization of nerves.

Expt. 30.—Large calico frog—*Rana fontinalis.* 3.25 P.M. Frog can leap 3½ feet; gave about gr. ¼ veratroidiæ sulph. 3.28. Frog disposed to be quiet, cannot leap more than 1½ to 2 feet. 4. Frog very weak; made two or three leaps of 2 feet each, but so exhausted refused to move when struck or pinched; gr. ¼ additional administered. 4.5. When laid on back in water struggles consciously to get on belly; after some time able to do it. 4.20. Very little change in frog's condition; gave gr. ¼ additional. 4.35. Frog croaking faintly; some convulsive movements, apparently vomiting quantities of thick slime; weak aimless movements when laid on back. 4.45. Frog motionless; only occasional convulsive efforts. Crural nerve exposed; muscles of leg responded pretty well to feeble galvanic current through nerve.

Remarks.—Experiments 26, 27, and 28 show that the viridia produces paralysis not by an action exerted upon the conducting nerves or the muscular tissue. The excitability of the nerves seems in some cases to be even increased, and the muscles respond vigorously to stimuli. Reflex actions appear, however, to be almost entirely suspended. I have never seen but the faintest indications of them. Sensation appears to be diminished although not so rapidly as motility. When the nerve centres are examined after death from viridia, they are always found pale or else passively congested with dark blood. It is evident that viridia exerts a powerful direct or indirect action upon the spinal cord, and the post-mortem appearances agree with symptoms during life in determining that such action is of the nature of sedatives. It is possible that the depression of the circulation may be the immediate cause of the failure of nerve power. My experiments do not positively settle this, but certainly indicate very

strongly that viridia exerts a direct influence upon the motor nerve centres. The loss of power commences very early and progresses very rapidly, and is entirely different in its whole course from that seen when one of the cardiac poisons proper has been used. In their recent paper on the "Application of Physiological Tests for Digitaline," Drs. Fagge and Stevenson sum up the effects of a cardiac poison as follows: 1. Peculiar form of irregularity in the cardiac beats; 2. The stoppage of the ventricle in the white contracted state; 3. The retention of the voluntary power at the moment when the pulsations of the heart first cease, and for at least 15 to 20 minutes afterwards; all of which symptoms are utterly different from those produced by viridia.

The results obtained by the recent investigation as to the physiological action of the latter alkaloid, may be summed up as follows:—

1. It appears to be but very slightly, if at all, locally irritant.

2. It has no action whatever upon the alimentary canal; never producing either vomiting or purging.

3. It exerts no direct influence upon the brain, and the pupil is not affected by it, except it be an indirect dilatation just before death.

4. It is a spinal motor depressant (probably directly so), producing death by paralysis of the respiratory nerve centres, and is without action on the muscles or nerves.

5. It is a direct depressant to the circulation, lowering the force and rapidity of the blood streams, slowing the action of the heart and finally affecting the force of the single beat independent of any spinal action it may exert.

Veratroidia appears to be physiologically as well as chemically in many respects midway between viridia and veratria; locally it is more irritant than the former, less so than the latter. It possesses somewhat similar powers to the former on the heart, although to a less extent, and seems midway between the two alkaloids in its action on the nervous system and muscles, acting chiefly on the spinal centres, but appearing at the same time to impair the conducting power of the nerves and the irritability of the muscles.

Its influence on the animal may be summed up as follows:—

1. Locally it is somewhat irritant.

2. It is an irritant emetic and sometimes cathartic.

3. It exerts no direct influence upon the brain or upon the pupil.

4. It is a direct spinal motor depressant, producing death by asphyxia, and acting at the same time to some extent upon the conducting nerves and the muscles.

5. It depresses the heart's action both in force and frequency, but the period of depression is followed by one of reaction, its primary cardiac action being independent of its spinal influence.

Resin of Veratrum Viride.—Before the labours of Mr. Charles Bul-

lock, the resin, so called, of veratrum viride had been shown to have the power of depressing the pulse, but it had been freely conjectured that this resin was really a complex body containing a distinct alkaloid. This is now known to be the case. After this alkaloid is entirely taken out of the resinoid mass, there remains, however, a dark substance soluble in alcohol, which appears to be the pure resin of the plant. It is a matter of much interest to determine whether this purified resin has any action on the economy, and if so, what it is.

Mr. Bullock's experience with it is as follows:—

"One-third of a grain of the resin dissolved in alcohol was taken every half hour until one grain was administered. No effect on the circulation or other result was noticeable. On a second trial the same dose was administered at the same intervals until two grains were taken. No effect on the pulse in force or frequency was observed; the only result—an unexpected one—was great prostration of the digestive functions, subjecting the experimenter to a temporary but severe attack of dyspepsia. Not being familiarized with this popular complaint the experiment was not pushed farther."—*Am. Journ. Pharm.*, 1868, p. 64.

In order to determine, if possible, the action of the resin still more conclusively the following experiments were instituted.

Expt. 31.—October 21, 3.35 P. M. Pulse 80; I have just taken gr. j alcoholic resin of veratrum viride. 4. Stomach feels mawkish and slightly nauseated; pulse 82. 4.15. Took gr. j additional. 4.30. Pulse 76; slightly nauseated. 5. Pulse 80; still feel slightly nauseated. 5.20. Took two grains additional. 6. Pulse 76; nausea marked, relieved at times by eructations of wind. At 6½ P.M. I took supper, although food was repugnant to me, and I ate but little. All through the evening I suffered from decided dyspepsia, partially relieved by a glass of whiskey. A feeling of tightness, nausea, stomachic wretchedness, with frequent eructations of wind, were the main symptoms. The pulse was not manifestly affected, nor were there any indications, save those mentioned, that I had taken anything unusual.

Expt. 32.—Gave gr. ½ of resin of veratrum viride dissolved in alcohol to an adult pigeon by stomach. 10 *minutes.* Pigeon vomiting, no purging. 15 *minutes.* Pigeon vomiting violently. 20 *minutes.* Pigeon still vomiting. 30 *minutes.* Pigeon still vomiting violently. 35 *minutes.* Pigeon vomiting violently in paroxysms, no other appreciable symptoms. 40 *minutes.* Vomiting ceased. There were no other appreciable symptoms, save the depression of the vomiting, but it was several days before the pigeon recovered from this.

Expt. 33.—Gave gr. j alcoholic resin in alcohol by stomach to a half grown English rabbit, no perceptible effect.

Expt. 34.—4.30 P. M. Gave by stomach 8 grs. of resin dissolved in f℥ss of alcohol to a full grown English rabbit; rabbit resisted vigorously, and did not get, I think, more than 4 grs. Immediately after operation, animal very weak, scarcely able to move; heart acting somewhat irregularly; breathing slow, laboured, with open mouth; probably some injury to glottis during active resistance to passage of tube. 5. Rabbit much in the same condition, but a little livelier and breathing less labored; no vomiting or purging. 6. Rabbit better; running about some, although same peculiar labored breathing. 7. Rabbit more lively, hopping about a little, but with breathing worse, now accompanied by a peculiar groan-like noise. 10. Animal a little livelier, but with same difficulty in breathing, evidently, I think, caused by injury to throat; no purging or vomiting. The next morning the rabbit showed unmistakably that his larynx had been severely injured, and there can be no doubt but that there were no appreciable symptoms induced by the resin.

Remarks.—These experiments show conclusively that the resin of veratrum viride has no effect upon the circulation; that it is inert so far as the medical virtues of the plant are concerned. That it has some local action upon the stomach is indicated by the violent vomiting it induced in the pigeon, and the gastric disturbances it caused in the human subjects. That it is the resin which produces the distressing vomiting often seen when the fluid extract or tincture of veratrum viride has been taken is, I think, however more than doubtful. Its action is probably not powerful enough in the small quantities given to do more than aid and abet its more active compeer, veratroidia. Still, as it does aid that alkaloid in its unpleasant action it is an object to get rid of it, as far as practicable, in any preparation of the drug.

Therapeutical Remarks.—The experiments which have been detailed prove, I believe, that in viridia, the profession has a remedy, by means of which all the peculiar sedative influence of veratrum viride can be obtained, without the horrible nausea and vomiting which always occasion so much discomfort, and which in some instances endanger life. As an instance of the latter, it is perhaps admissible to speak of a case of remarkable recovery which came under my notice. A woman had had her abdomen torn by an enraged bull, so that nearly the whole of the sigmoid flexure of the colon was protruded and covered with dirt. It was carefully washed, replaced, and the external wound sewed up. Opium and veratrum viride were freely administered; her pulse was kept to about 40 per minute, I believe, for some days, and she recovered without general peritonitis. The greatest constant source of anxiety in the case was the vomiting induced by the American hellebore, which threatened to tear open the wound. It is in such cases that viridia will be especially useful. No experiments on animals are absolutely satisfactory unless confirmed upon man himself. There is, however, in the present instance not so much need of this comparative study upon man, as it has already been abundantly shown that the crude drug acts similarly upon all the domestic animals, including the *genus homo*. Moreover, it is well known that the veratrum viride is a direct arterial sedative to man. I have had no opportunity of using the alkaloid therapeutically, but have instituted the following experiment upon myself.

Before detailing this, however, I quote the results of Mr. Charles Bullock's experiments, extracted from his paper in the *American Journal of Pharmacy*, 1868, p. 98; reprinted from the Proceedings of the American Pharmaceutical Association:—

"A more extended experience is desirable to attest the effects of this alkaloid. Several trials were made by administering it to persons in health; the results of the experiments are as follows: One-fortieth of a grain of the alkaloid dissolved in alcohol was administered every quarter of an hour, until one-eighth of a grain was taken; half an hour after taking the last portion the pulse in each case was reduced from eight to twelve

beats in the minute. No nausea or other effects were experienced. An impression was produced on the throat resembling that caused by pyrethrum, and the benumbing effects of aconite were wanting."

Expt. Oct. 17. Pulse, 85 in a sitting posture. Took, 11.40 A. M., gr. $\frac{1}{16}$th viridiæ sulph. in aqueous solution. Taste bitterish, disagreeable, peculiar—reminding one of the odour of spermatic fluid. 12 noon. No reduction of the pulse; ever since swallowing dose there has been a persistent, peculiar numbness in the fauces. Took gr. $\frac{1}{16}$th additional. 12.15. After second dose the numbness of fauces was for awhile very marked; not so much so now; a general feeling of languor and quietness; a sense of exertion in going up stairs. 12.35. No reduction in number of pulse; took gr. $\frac{1}{16}$th additional. 1 P. M. Pulse when quiet, 76 per minute; numbness still persists in fauces. 1.40. Pulse about the same; took gr. $\frac{1}{16}$th additional; eaten heartily since last observation. 2.10. Pulse 80; took gr. $\frac{1}{8}$th additional. 2.40. Pulse 74; numbness of throat not noticeable. 3.15. Pulse 69; took gr. $\frac{1}{8}$th additional; no sickness of stomach. 3.40. Pulse 66. 4. Pulse 72; took gr. $\frac{1}{8}$th additional. 4.30. Pulse 73; took gr. $\frac{1}{8}$th additional. 5.15. Pulse 67; decided feeling of weakness; no other symptoms. 5.30. Pulse 68; any exertion an effort, and when forced rapidly sending pulse up to 110. Walking once or twice around a room sufficient to do this. 6. Pulse 70; any exertion painful. Dr. Allen coming in, asked what is the matter; you look so languid. 6.15. Pulse nearly 70—down at times to 62. 6.20. Took two ounces of brandy. 6.40. Just finished supper; pulse 66. 7. Pulse 70; no digestive disturbance or other symptom has been manifested at any time since taking medicine, save only in the slowing of the pulse and the marked, pleasant muscular languor. The benumbing of the throat appeared to be caused by the contact of the medicine in swallowing, and there was no tingling sensation, such as is felt when under the influence of aconite.

As far as can be judged from these few experiments upon man, the commencing dose of viridiæ sulph. may be set down at the sixth of a grain, repeated every hour, and increased until the desired end has been reached. I have never observed any marked cumulative effect—by which I mean in this connection—any very marked increase of the symptoms by small doses when the alkaloid is given every hour. The effect of a single moderate dose does not appear to be very long continued, reaching, I believe, its maximum in about an hour. Further experience upon this point is however necessary; a study of the action of the medicine in disease alone can settle it. I believe the alkaloid to be preëminently safe as compared with other remedies with equal power, *i. e.*, it would be much safer to reduce the pulse rapidly 20 beats per minute, and the force of the blood stream correspondingly, with it, than with any other known remedy, and I therefore ask for it a speedy and thorough trial by hospital physicians. Owing to the immense loss of the alkaloid by the methods of preparation which have hitherto been pursued, the expense of manufacture is at present great, but there can be but little doubt that the stimulus of demand would call forth from Mr. Bullock or some other pharmaceutist new methods, obviating this loss, and that the alkaloid could be furnished at a very reasonable rate.

If any case of poisoning from it should arise, the treatment should be such as would be suitable were veratrum viride itself the agent. Perfect quiet in the horizontal position; brandy and ammonia freely; opium, or perhaps better still, atropia cautiously; and, on general principles, strychnia.

ART. IV.—*On the Diagnostic Value of the Corpuscular Blood-Elements in the Urine of Bright's Disease.* By JOSEPH G. RICHARDSON, M. D., Microscopist to the Pennsylvania Hospital, Philadelphia.

MOST general practitioners of medicine, when called upon to investigate an obscure case of Bright's Disease, have probably felt the want of some more definite guides to the exact condition of the kidneys than those furnished by the proportion of albumen in the renal secretion, or the character of the tube casts which the urine contains; and although it seems at first sight an arduous task to attempt supplying the student with any additional aid beyond that afforded by the admirable manuals published by Doctor Dickinson, and, more recently, by Doctor Grainger Stewart, yet my connection with the hospital has enabled me to carry on some researches which, enlightened by the new discoveries in regard to pus and mucus, may serve to render certain doubtful cases of this affection somewhat clearer than they would be without such assistance. It seems remarkable, indeed, how meagre are the references to the diagnostic importance of blood in the urine made in the monographs above mentioned; the former of these gentlemen observing in respect to casts (p. 18): "If pus [white blood] cells are included, the inflammatory or catarrhal state has taken such hold of the tubes that the epithelial cells are replaced by pus globules. Blood globules will show that there has existed enough congestion to rupture the Malpighian capillaries." While the latter dismisses the subject with little more than the statement (p. 15): "And, lastly, some [casts] are found in which blood corpuscles in varying quantity are present. Along with the tube-casts, and sometimes in large quantity, blood corpuscles altered by the action of the fluid in which they lay [*sic*], are found."

As, however, the important advance in pathological science, to which I have alluded, is still spoken of in this country under the title of "Cohnheim's alleged Discovery," it may not be unnecessary to advert briefly to its merits and the testimony which supports it. Dr. Cohnheim, as the readers of this Journal are aware (see number of this Journal for Oct. 1869, pp. 549–552) first published his theory of Inflammation, and detailed the original and ingenious experiments from which it was built up, in a leading article in *Virchow's Archives* for September, 1867, which soon attracted everywhere the notice of histologists. According to Cohnheim the process of pyogenesis consists first, in a partial interruption of the flow of blood by which the red corpuscles move more slowly through, or almost block up, the capillaries, while white globules adhering to the parietes of the vessels arrange themselves in a layer upon this inner surface of the walls; and second, in the "wandering out" of these white blood cells through the stomata, demonstrated by Recklinghausen in the walls

of the finer bloodvessels by virtue of that amœboid movement which is one of the most remarkable attributes of the white blood corpuscle, and so aptly illustrated by an English commentator on Prof. Huxley's lecture upon Protoplasm, when he explains the process of an amœba taking a minute diatome into its substance for food, by comparing it to a lump of dough growing of itself gradually around an apple to make an apple-dumpling: the white blood corpuscles which have thus wandered out then constitute with exuded serum that yellow fluid, so long known under the name of pus, and hitherto generally supposed to be a product of the breaking down of tissue. In support of this doctrine experiments upon frogs and rabbits paralyzed by woorara are described in which the mesentery of the animal being exposed and spread out upon the field of the microscope, multitudes of white corpuscles were *seen* in all stages of transit from the interior to the exterior of the vascular walls, in which latter position they constituted ordinary pus globules.

Of course such a novelty in medical science has met with numerous assailants, among whom the most prominent seems to be Prof. Kolman Balogh, of Pesth, who, in an article in *Virchow's Archives*, (Erstes Heft, Band xlv. S. 19, u. s. w.), asserts that in spite of the most prolonged and careful attention not once could he see the transit of the white blood cells through the stomata in the vascular walls, which he thinks if they exist are such minute pores that they can give passage only to fluids. His observations are, however, sharply commented upon by Dr. A. Schklarewski, of Moskow, in the following volume of the *Archives* (Band xlvi., Hft. 1, S. 116) and Cohnheim's experiments appear (*Transactions of Pathological Society of London*, vol. xix. p. 467) to have been repeated before the London Pathological Society in April, 1868, by Dr. H. Charlton Bastian, of London, with entire success. In our own country Lieut. Col. J. J. Woodward, Surgeon U. S. A., stated during a lecture at the Philadelphia College of Physicians, May 31st, 1869, that the experiments of Cohnheim had been tested under his direction in the Surgeon-General's Office at Washington, and that he had found the description of phenomena singularly accurate; the observations on frogs being fully corroborated, as far as they had time to repeat them, in every particular, and Dr. William F. Norris, of this city, but for some years past residing in Germany, in an article now in press, detailing observations made, chiefly on the corneæ of frogs, in conjunction with Prof. Stricker, of Vienna, while maintaining that some of the corpuscles of pus originate in the proper cells of the tissue, admits as indubitable, that many are in reality white blood globules which have made their way through the walls of the vessels, as Cohnheim describes.

It has been urged, however, by some assailants of this doctrine, that even admitting, for the sake of the argument, Cohnheim's views on inflammation to be correct as regards the inferior animals, upon which his experiments

were tried, there is no proof that the same ignoble process of suppuration affects man, a creature of such far higher attributes; but, on this point I trust that my own experiments, published in the *Pennsylvania Hospital Reports* for 1869, will be found conclusive. By diluting a drop of my own blood upon a slide, with pure water introduced at the margin of the thin glass cover, and thus reducing the liquor sanguinis to the specific gravity of the saliva, I found it quite possible to watch every step of the change, in which by mere distension the white blood cell is converted into the salivary corpuscle, with its one, two, or three nuclei, its actively revolving molecules confined by a cell wall of exceeding tenuity, capable of presenting all the phenomena of deep-staining of the nuclei with the entire cessation of movement on the addition of aniline dye. In like manner, when the liquor muci and liquor puris are similarly diluted their corpuscles are also seen for the most part to be converted into salivary globules, and I infer therefore that we may regard the strong presumption afforded by Cohnheim's experiments upon the rabbit as established into a fact, and conclude that most (at any rate) of the corpuscles of *human* pus are simply white blood cells which have wandered out through the vascular walls.

But interesting as these researches are from a scientific point of view, it is only as they can be applied to diseased states of the human organism that they become of real importance to the physician; and my object in the present paper is to make some practical deductions in regard to the congestive and inflammatory processes undergone by the kidneys during the course of Bright's disease. I find, however, that some of the experiments I had planned in relation to this subject have been anticipated by Prof. Axel Key, of Christiania, Sweden, who, in a paper partly translated for the columns of the *Medical Times and Gazette* for May 22d, 1869, p. 542, "On the Behaviour of the White Blood Cells in Inflammation of the Kidneys and Lungs," informs us that by setting up inflammation of different grades in the kidneys, and at the same time throwing cinnabar injections into the blood, he was enabled to follow the white blood cells in these processes; he believes that even in slight irritation the white blood cells, without interstitial changes and without hemorrhage, escape from the vessels into the renal glomeruli, and force their way into the tubes, sometimes one by one, and sometimes several together, and are found in the urine under the appearance of pus cells. Unlike Cohnheim, he thinks it is an absurdity to consider the white blood cells as pus corpuscles under all circumstances as soon as they have left the walls of the vessels, and is of the opinion that he has found that the leucocytes may remain on the lining membrane of the tubules, and develop into epithelium. He further states: "In morbid changes in the kidneys, the cells which have migrated from the glomeruli and from the interstices into the tubes, and which resemble pus cells, may occur in great abundance in the urine, both isolated

and forming whole cylinders, without the slightest trace of suppuration or actual pus formation being discoverable in the kidneys." These views in regard to the significance of pus (white blood) casts, contradictory as they are, not only to the opinions of older authorities on Bright's disease, for example George Johnson (*Diseases of the Kidney*, p. 418), but also to those of recent writers, such as Beale, Dickinson, and Grainger Stewart, nevertheless fully coincide with my own clinical observations as will be seen in the sequel. It will perhaps be objected as before, however, that since they were made upon inferior animals alone, they afford no proof that the same changes occur in man, yet this doubt can be easily set at rest by a simple modification of my experiments, such as diluting specimens of fresh human urine containing pus or mucous globules, until a hydrometer immersed in the fluid marks the specific gravity of 1005, when on examination with a sufficiently high power the ordinary salivary corpuscular form of the white blood cell may be readily detected.

If now, aided by these various researches, we endeavour to trace the course of renal inflammation in its simplest form, that from traumatic irritation, we are led to conclude that a first departure from a state of perfect health may originate in the mere mechanical effect, through pressure, of some foreign body, such as a small uric acid calculus, or a plug of adherent white blood corpuscles, acting exactly like the hot iron or filament of thread used by Cohnheim to set up inflammation in the cornea of the frog. This produces a partial or complete stasis of the blood in the neighbouring vessels, whose first or least amount results in the migration of a few leucocytes and the exudation of liquor sanguinis, which, mingling with the urine, renders that fluid slightly albuminous; the second or medium degree in the formation of tube casts called fibrinous (sometimes it appears to me on insufficient evidence), and the abundant "wandering out" of the white (accompanied by a few red) blood cells through their power of amœboid movement, as described by Cohnheim, and well known to occur in inflammation of mucous membranes analogous to that lining the uriniferous tubules; lastly, when of its third or highest intensity, in the free escape of the red blood disks in addition to the other elements alluded to, either *per rhexin* or by their peculiar mode of exudation through the walls of the minute capillaries.

As examples of the first of these forms occurring in other tissues of the human organism, may be instanced the anasarca produced by an abdominal tumour obstructing the reflux of blood through the vena cava, the œdema of the eyelids in the forming stage of hordeolum, and the flow of transparent serous fluid during the early period of an ordinary cold in the head.[1] The second is illustrated by the secretion of pus in acute cys-

[1] Dr. Dickinson quotes (*Pathology and Treatment of Albuminuria*, p. 15), Dr. George Robinson of London, as having proved experimentally on animals that

titis, or its development in an ordinary phlegmon; and the third finds its analogue in the mingled pus and blood discharged from the mucous membranes during the height of an attack of gonorrhœa and rarely of virulent ophthalmia. Of course, like the inflammatory process in other portions of the system, nephritis may terminate naturally by resolution, or be cut short by successful treatment in either the first or second stage, as above described; a restoration of the affected parts to perfect health,* doubtless so terminating as a rule in the gradual retrograde manner, we daily observe in convalescence from an attack of inflammation of the conjunctiva or of the Schneiderian membranes. It would seem, however, that white blood corpuscles imbedded in delicate hyaline casts, as well as floating freely in the urine, may rarely continue to occur for some time after the ordinary symptoms of Bright's disease disappear, being perhaps merely the results of previous inflammation from time to time washed out of the uriniferous tubules, as probably took place in Case VI., below detailed. It must by no means be supposed that I mean to assert the process of inflammation in the living organism presents such sharply-defined stages as those above described; on the contrary, just as a naturalist is perplexed when called upon to draw the dividing line between the animal and vegetable kingdoms, so the morbid anatomist, and *à fortiori* the physician, will occasionally meet with cases of nephritis, where it is almost impossible to decide the grade of inflammatory action. It would appear, however, that such examples are exceptional, and that in a large majority of instances the unhealthy condition can be classed in one of the three categories just mentioned. Indeed, on seeking to arrange the collection of facts I have gradually accumulated in regard to Bright's disease during numerous examinations of specimens from patients in the hospital wards, and also in the private practice of medical friends, as well as in my own, I find most series of phenomena are capable of being grouped together in accordance with the views above expressed, and serve to elucidate one among the many important applications of which the doctrines of Cohnheim are susceptible.

In order, however, to determine from microscopic examination of the urine, not only the grade of inflammation, but its tendency (*i. e.*, whether advancing or retrogressive), several observations upon specimens obtained at intervals of a day or two will generally be necessary, and that they may afford the greatest assistance in diagnosis, these should be made comparative in their character. The method I have been led to adopt for the accomplishment of this object has at least one merit, that of simplicity, as will be seen by the following description: The sample of urine to be

albuminuria resulted from ligature of the renal vein, and Dr. Grainger Stewart (*Bright's Disease of the Kidneys*, p. 33) has confirmed this statement by his own observations.

tested is placed in a conical graduated measure of at least four fluidounces capacity, carefully covered and allowed to remain undisturbed for twelve hours, when the bulk of deposit is noted; a small amount of the sediment is removed from the bottom of the vessel by means of a glass tube drawn off to a moderately fine point, two or three of the last few drops that have entered allowed to escape and the outside of the pipette wiped dry; a minute portion of the remaining contents is then deposited upon a slide, covered with a square of thin glass measuring exactly half an inch across, and the surplus moisture absorbed from the margin of the covering glass by a soft linen rag, great care being taken to avoid movement of or pressure upon the square. It is obvious that by adjusting a slide thus prepared upon the stage of the microscope, so that for instance the right upper corner of the cover shall occupy the field of view, and by means of the horizontal stage movement running it across until the left upper corner appears, then raising the stage with the vertical movement the width of a single field, reversing the horizontal motion as far as the right border, and so on, every part of this film of fluid measuring one-fourth of one square inch may be examined and the number of its contained red and white corpuscles, tube casts, epithelial cells, &c. accurately ascertained. The apparent magnitude of this surface when viewed under a one-fourth inch objective giving an amplification of two hundred diameters will, of course, be nearly seventy square feet, so that time would be needlessly wasted in enumerating all the cells, &c. seen in such an area, except when very sparsely distributed; if abundant, counting those seen in a few fields, or even in sundry thousandths of an inch (as marked off between the threads of the cobweb micrometer), and noting the average, will often answer every purpose. Although for estimations of this kind a quarter of an inch objective is amply sufficient, I have constantly found great advantage from a subsequent examination with a very high power, afforded by an objective of much shorter focus, for while by deeper eye-piecing an equal enlargement may be obtained, yet obscure points of structure can be much better seen *for the first time* by the aid of a twenty-fifth, for example, magnifying twelve hundred diameters with the lowest eye-piece, than with a quarter or eighth so combined with powerful eye-pieces as to yield a similar amplification; such at least is the result of my experience in hundreds of trials, and I feel confident that additional benefit will often be derived from the use of a fiftieth, which I have just procured from Messrs. Powell & Lealand, as, for instance, in the diagnosis of white blood corpuscles from the nuclei of renal epithelium, and in the detection of those very minute oil globules which mark the earliest stage of fatty degeneration in the cells of the uriniferous tubules.

Since any consideration of the diagnostic values possessed by other constituents of the urine in Bright's disease does not fall within the scope of my present paper, as stated above, I propose to dismiss the forms of

albuminuria in which the chief or important lesions are fatty, amyloid or granular degeneration, and confine myself to the consideration of those pathological states where red and white blood cells appear in the urine, and can be regarded as indicative of some renal affection. It is obvious that vesical or urethral irritation may at any time cause the urine to exhibit most of the chemical reactions and microscopic appearances found in Bright's disease, and cases doubtless occur in which it is impossible to distinguish at a first sight whether the blood elements are effused in the bladder or kidney, yet by a careful investigation, not only of the local and general symptoms, but also of the history of the patient, correct conclusions may generally be obtained. In the following instance it seemed, however, impossible to determine the seat of the malady until a second examination disclosed the existence of tube casts:—

CASE I.—Mr. J. L., æt. 50, consulted his family physician on the 26th of September, 1869, on account of the condition of his urine, as he supposed he was passing blood. Careful investigation failed to reveal any constitutional or local symptoms of disease except slight pain in the loins, a little uneasiness in passing water, and some diminution in the amount of fluid voided during twenty-four hours; no exciting cause of the seizure could be discovered, nor was there present any diathesis hereditary or acquired which might be considered as a predisposing agent. Four fluid-ounces of his urine passed the next morning were of a bright red colour, and on standing let fall a dense pinkish deposit which occupied about f℥iij of the liquid; under the microscope this sediment was found to be composed chiefly of red and white corpuscles in the estimated proportion of fifty of the former to one of the latter: there were also numerous epithelial cells chiefly vesical, many of which were deeply stained with hæmatin. A specimen of next day's urine, after he had been cupped on the loins, was much lighter in colour, and on microscopic examination was found to deposit but about one-twentieth the amount of corpuscular blood elements existing in the water passed the day previous, although the coagulum produced by heat and nitric acid was at least one-fourth as bulky; thus indicating that the albumen did not proceed solely from effused blood. The sediment also contained a large amount of oxalate of lime, and on examining the fourth of a square inch of urinous film one well-marked cast inclosing white blood cells and several doubtful aggregations of matter resembling tube casts were discovered. A specimen of the urine brought to me on the 22d of October was found to be normal in colour and appearance, specific gravity 1020, neutral in reaction, and when tested with heat and nitric acid still showed a notable amount of albumen, the coagulum not exceeding, however, one-twelfth of the fluid boiled. Three ounces allowed to stand undisturbed in a conical glass deposited nearly f℥ij of light cloud-like sediment, which under the microscope showed a very few oxalate of lime crystals, about on an average twenty blood corpuscles, of which four were white globules, to each field, and in one-fourth of a square inch of urinous film two well-marked faintly granular casts. At the date of this last examination the patient showed no obvious symptom of disease, and reported that he had enjoyed fair health through the interval and passed no more blood.

Among the means of distinguishing when the effused blood is of vesical and when of renal origin, it is to be noticed that the seat of pain or soreness on pressure is one of the most important; of less general application, although of course more positive when it occurs, is the existence of tube casts in the urine, which, when indubitable, prove, I believe, that we have to deal with nephritis. Care must, however, be taken to avoid confounding accidental aggregations of matter with genuine casts from the uriniferous tubules, for I have seen at least a thousand pseudocasts, and excellent imitations too, that were produced in an instant by a slight sliding movement of the thin glass cover. It is not, I believe, common to meet with more than two or three specimens of the rounded epithelium from the uriniferous tubules upon a single slide, unless desquamative nephritis exists, and should the cells exhibit distinct oil globules, even although not more than $\frac{1}{3000}$ of an inch in diameter, great force would be added to the presumption of Bright's disease, derived from the presence of the blood elements associated with renal epithelium. It is also, I think, rare for us to detect the amœboid movement, and unusual to find even the irregular shape which precedes the complete death of the motionless leucocyte in pus (white blood) corpuscles from the kidney, while this motion may often be observed in the urine of cystitis, especially if examined while fresh and without being allowed to cool below the normal temperature of the body. As mentioned by Prof. Beale, phosphatic crystals seldom occur with pus-cells from the kidney, a useful aid to diagnosis when we are able to exclude suspicion of coexisting trouble about the bladder. Of course the detection of tube-casts with red and white corpuscles imbedded in their substance is a positive index of Bright's disease.

Supposing now that by the assistance of any or all of these indications we have been able to eliminate vesical irritation as a cause of the presence of blood-elements in the urine, it remains to be seen how far the actual number and relative proportion of the red and white corpuscles serve to point out the past, present, and future of the renal affection.

First. When the red blood globules very largely exceed the white in number, approximating to the proportion in normal blood, it is probable, as intimated above, that rupture of some small vessels has taken place, and the flow of blood is a true hemorrhage from the kidney, which may be produced by blows across the loins or lacerations caused by angular calculi. This opinion will be further strengthened if a thorough search fails to reveal any tube-casts, and if the albumen as coagulated by heat and nitric acid is no more than should exist in an amount of liquor sanguinis corresponding to the bulk of deposit formed of cell walls from the red disks.[1] As an approximative guide for determining this last point, I find by experiment that a fluidrachm of blood stirred up in two fluid-

[1] See my paper in the Am. Journal of the Med. Sciences, July, 1869, p. 53.

ounces of water lets fall, on standing twelve hours, a whitish deposit of fibrin and cell-walls, measuring about two fluidrachms, and that a portion of the supernatant liquid tested with heat and nitric acid yields a coagulum, chiefly albuminous, occupying about one-fourth of its bulk.

In the following example the irritation appears to have been mechanical, but no evidence of resulting nephritis could be detected.

CASE II.—E. R., gentleman, æt. 60, consulted his medical adviser in the early part of June, 1869, on account of a dull pain in the region of the right kidney; he had also been troubled with a little dyspepsia and a slight tendency to diarrhœa, but had not been exposed to cold, or suffered any strain or blow in the dorsal region. There was no pain in the bladder, no history of gravel, and no perceptible gouty diathesis, although his father had been the subject of some renal irritation in advanced life. He had no headache, no œdema of the face or ankles, and the very faint febrile movement seemed obviously due, with the slight diarrhœa, to a little gastro-intestinal catarrh. The urine, which was quite dark in colour, was found to be acid; specific gravity 1021; free from sugar but yielding a slight cloud on the application of heat, which, as it did not wholly disappear after nitric acid was added, doubtless indicated the presence of albumen. On placing a drop of the urine from the bottom of the glass beneath a microscope, the deposit was found to consist of small crystals of oxalate of lime, and red and white corpuscles, the former generally quite decolourized. As the blood-elements bore to each other almost their normal proportions, it seemed probable that they proceeded from some abrasions or other solutions of continuity caused by small angular renal calculi rather than from an exudation through the walls of the vessels, an opinion almost substantiated by the subsequent history of the patient, who rapidly convalesced under suitable treatment for the oxaluria, and when last heard from, four months later, was in excellent health.

Second. When in Bright's disease the white blood corpuscles are mingled with red disks in a proportion exceeding one twenty-fifth of the latter, my observations lead me to conclude that generally the patient is suffering from an acute or subacute inflammation of one or both kidneys, and attended with danger therefrom more or less serious, according as the amount of corpuscular elements shows by its absolute quantity that a larger or smaller portion of the kidney is inflamed. If the albuminous coagulum produced by heat and nitric acid occupies more than one-half the fluid tested, and many times exceeds that which would be furnished by the liquor sanguinis corresponding to the blood corpuscles, an extensive inflammatory disease probably exists, unless careful microscopic scrutiny shows decided fatty degeneration (and consequent loss of secretive power) in the epithelium of the uriniferous tubules. The following case, for whose complete history I am indebted to the note-book of my friend George Pepper, M. D., illustrates some of the views above enunciated.

CASE III.—G. M., wheelwright, æt. 43, married, and father of four healthy children, was admitted into the men's medical ward of the Pennsylvania Hospital, 12th August, 1869, under the care of Dr. J. Forsythe

Meigs, to whose courtesy I owe permission to make use of this report. The patient stated that he came of a long-lived family, and had always enjoyed good health; that he had been in America about eleven months, and had a stormy passage out, during which he was somewhat exposed. His habits have been moderately temperate, and he has never had any venereal disease. Fifteen years ago he injured his hand, losing the third and little fingers, but the wound was carefully treated, healing up within thirty days, and without extensive suppuration. For several years past he has always been obliged to rise once or twice during the night to urinate, but the water has never been smoky or bloody; during this period he has noticed a slight puffiness of the ankles after long walks or prolonged standing. About two months before admission his feet first began to swell, at which time he appeared to be in his usual health, and had no new symptoms, but soon after he had an attack of profuse diarrhœa, unaccompanied by backache, pain in the bladder, enlargement of the abdomen, or puffiness of the eyelids, and not severe enough to confine him to bed, even for a day, or prevent him from working as usual. From that time the dropsy gradually increased, invading the legs, thighs, scrotum, and abdomen, until about two weeks before his entrance into the hospital, the skin of his legs cracked open in several places, and a profuse discharge of serum occurred. On admission, his complexion was pale and waxy; his legs were enormously swollen (the calf measuring $18\frac{3}{4}$ inches in circumference), fissured, and the skin covered with chronic eczema; a slight squamous eruption, bran-like in appearance, also affected the face, neck, and upper portion of the thorax. There were no abnormal heart sounds, cough, or dyspnœa; bowels rather loose, although at times regular; appetite good, and tongue clean but pale. He passed water frequently and in great abundance, which, on examination by the resident physician, was found to be light coloured, slightly acid in reaction, and on being tested with heat and nitric acid, to yield about one-eighth of its bulk of albuminous coagulum. On the 16th of August, when his general condition was much the same, although the swelling of his legs had diminished, and the eczema had disappeared, he passed seventy ounces of light-coloured urine, of the specific gravity of 1018, and still containing a large amount of albumen. Of this urine I obtained a specimen for the first time, and on examining the rather abundant deposit which it let fall, I found it to be composed of white and red blood corpuscles, in proportion of one to five, a few darkly granular, faintly granular, and pale hyaline casts, and numerous elongated masses, composed chiefly of epithelial cells, which appeared to have undergone a remarkably equal fatty degeneration. These latter casts did not soon become tinted with aniline, as ordinary fibrinous and hyaline casts, although not germinal matter, readily do. On the 1st of October his condition was decidedly improved; he had gained flesh and colour, had a good appetite, and slept soundly at night. He had then no dropsy, but the urine continued abundant, amounting to eighty fluidounces in twenty-four hours, and still obliging him to rise in the night to micturate at least once and sometimes twice; heat and nitric acid continued to throw down a bulky coagulum of albumen. On the 15th of October a specimen of urine, of which he passed ninety-six ounces in a day and night, was examined carefully as above described, when it was found that one-fourth of a square inch of urinous film from the three fluidrachms of light cloudy deposit let fall by four fluidounces standing twelve hours, contained twenty-eight pale granular casts, some inclosing epithelial cells, white blood cor-

puscles, and red disks; one of these casts, about $\frac{1}{40}$ of an inch long and $\frac{1}{300}$ of an inch in diameter, faintly granular in character, had imbedded in it two white blood corpuscles, five red ditto, and one epithelial cell. Numerous red and white blood globules floated freely on the slide, in the proportion of about one white to twelve red, the latter averaging five to each field. Under a power of 1200, the generally hyaline casts were seen to have small particles of granular matter resembling oil globules deposited upon their surfaces. The epithelial cells were only slightly fatty, the particles of oil not exceeding $\frac{1}{2500}$ of an inch in diameter. By the careful addition of aniline dye at the margin of the cover the large single nucleus of each epithelial cell, the one, two, or three nuclei of the white blood corpuscles, and the delicate membranous (or membranoid) wall of the red blood disks were brought out in a distinct and beautiful manner, dissipating in this instance, all difficulty in diagnosticating, each from the other. The coagulum produced in this urine by the application of heat and nitric acid, and also by heat alone, was still quite abundant, occupying fully one-fourth of the fluid tested; but in spite of this constant drain upon his system, the patient, under the influence of judicious treatment, nutritious food, and the excellent sanitary condition of the hospital, continued to gain flesh and strength, and on the 22d of October had wonderfully improved in general appearance.

CASE IV.—Exemplifies that frequent occurrence in the course of Bright's disease, an acute attack supervening upon one of the chronic forms, as follows:—

Ellen G., cloak-maker, æt. 29, unmarried, was admitted into the Women's Medical Ward of the Pennsylvania Hospital, May 2d, 1869, during the service of Prof. J. Aitken Meigs, who has kindly permitted me to report the case. The patient stated that her father died of consumption twenty-six years before, and her brother of dropsy in his twenty-second year. She had worked very hard at her trade for the last ten years, sometimes as much as fifteen hours daily, and during that time, nearly eight years since, had a severe attack of yellow fever, subsequent to which she had suffered much from dyspepsia, and been troubled occasionally with eruptions upon the face. About five weeks before admission she took a very severe cold, after exposure to wet, which was followed by a sense of weakness in the loins that gradually developed into a sharp pain in the lumbar and abdominal regions; nausea and vomiting, loss of appetite and intense thirst came on about the same time. One week later she first noticed puffiness of the eyelids; and a few days afterwards enlargement of the abdomen and œdema of the feet and legs came on. Shortly after taking cold she noticed that she was obliged to rise three or four times in the night to pass water, also that the fluid when voided was dusky, and deposited, on standing, a sediment that looked like coffee grounds. For the week following her exposure she had a troublesome diarrhœa, but since then her bowels have been regular, although severe griping pains in the abdomen still persisted. Throughout the week previous to admission she had been troubled with roaring noises in her head, but she did not suffer much from headache, and her intellect was quite clear. On entering the hospital her face, feet, limbs, and abdomen were all very œdematous, and her countenance presented the pale, waxy hue of Bright's disease in a very marked degree. A specimen of her urine examined on the 24th of May was of a dark reddish-brown colour, specific gravity 1010, and con-

tained about one-third of its bulk of albumen as coagulated by heat and nitric acid. Under the microscope I found the abundant deposit let fall on standing was composed of large numbers of red and white blood corpuscles in the estimated proportion of twenty-five to one, much granular debris, and some well-defined casts, granular, fatty and fibrinous, all more or less stained with the hematin from the decolourized red globules; some of the tube casts had imbedded in their substance epithelial cells which had undergone marked fatty degeneration, many of the oil globules measuring $\frac{1}{10000}$ of an inch in diameter. Under the influence of appropriate saline diuretics the flow of urine rapidly increased, and five days after the above examination was made the amount passed in the preceding twenty-four hours measured 112 fluidounces, which free diuresis soon produced a very satisfactory decrease in the anasarca and ascites, but I was unfortunately prevented by illness from making further examination of this patient, and can only add that she was discharged from the hospital on the 7th of August very much relieved.

The next instance is one in which the slight local nephritis of short duration appeared to be traumatic.

CASE V.—N. C. D., merchant, while apparently in usual good health, was attacked suddenly after breakfast on the 20th of September, 1869, with intense pain in the region of the left kidney, extending downward toward the groin. A specimen of his urine, examined on the 26th, was found to contain many uric acid crystals, numerous red and white blood-corpuscles in nearly equal proportions, and in half a square inch of urinous film three casts of the uriniferous tubules, having white blood globules and epithelial cells imbedded in their substance. The amount of albumen appeared to be but little more than that proportionate to the blood corpuscles, so that it was deemed probable that an angular calculus of uric acid had suddenly changed its place in the kidney, become impacted and set up a local nephritis confined to the small portion of renal structure in its immediate neighbourhood. The pain in the loins returned at intervals for some days, gradually becoming less severe, and under alkaline treatment passed off in about two weeks from the first attack, leaving the patient in good health, which he has enjoyed up to the present date (Oct. 22d, 1869).

Lastly, should we discover on examination that the white blood cells (hitherto designated as "mucous corpuscles," "exudation corpuscles," and by Dr. Beale "cells closely resembling pus corpuscles."—*Microscope in Practical Medicine*, p. 219) pass off from the kidneys with little or no admixture of the red disks, we may conclude that a chronic inflammation of the organs exists less or more extensive as the number of the leucocytes is smaller or greater and as the amount of fatty degeneration, estimated as above suggested, is serious or otherwise; for my researches tend to show that the one cause of albumen in the urine varies inversely as the other; that is, if in a given case of Bright's disease the urine containing say one-fourth of its bulk of coagulated albumen after boiling, shows many white blood corpuscles with epithelial cells only slightly fatty; and another specimen of the same, collected perhaps two months afterwards, exhibits with the same amount of albumen few leucocytes but epithelium containing

large oil globules, we may conclude that (following Dr. Grainger Stewart in his classification on the basis of Virchow's), we have to deal with the First or Inflammatory form (involving a large portion of the organs), which has passed from stage *a*, that of Inflammation, to stage *b*, that of Fatty Transformation; many cases, however, seem to run a much more favourable course, the pus corpuscles diminishing in number without any corresponding advance towards fatty degeneration in the epithelial lining of the tubules, so that the albumen slowly decreases in quantity, and the patient regains at least a comfortable state of health, as in the following example.

CASE VI.—X. Y., merchant, native of Philadelphia, but for some time past residing in one of the New England States, came under my observation August 8th, 1869. From his family medical attendant I learned that about six weeks before he had been exposed to cold and wet, which, acting upon a constitution enfeebled by the poisonous effect of lead and various other causes not necessary to mention here, had resulted in an ill-defined febrile attack, attended with pain in the back, and high-coloured urine; but that unfortunately from the fact of the physician himself being at the time an invalid, no examination of the renal secretion was then made. During the first week in August he was seen in consultation by Prof. Alonzo Clark, of New York, who, on testing the urine, discovered, as I was informed, a notable amount of albumen and several delicate hyaline casts of the uriniferous tubules. My first examination of the morning urine, made during the evening of August 9th, with the precaution above described, showed in three-quarters of a square inch of urinous film twenty-five or thirty epithelial cells, some of which inclosed very minute oil globules, about an equal number of free white corpuscles, and some exceedingly delicate hyaline casts, two of which contained one or more leucocytes; no red blood globules were detected; on testing with heat and nitric acid only a moderate opalescence of the liquid was produced, but this trace was deposited next day into a thin film upon the bottom of the tube, which proved entirely amorphous under the microscope. Frequent examinations of the urine from this patient were made with similar results, except that the amount of albumen gradually decreased until on the 27th of August my note-book states that the urine was clear and normal in both colour and quantity, and on testing with nitric acid not the slightest cloud was visible, nor was any produced by long boiling of the acidulated liquid. Four fluidounces set aside in a conical glass for two hours let fall a scanty flocculent deposit which, under the microscope, was seen to be composed chiefly of epithelial cells and white blood corpuscles, but also contained a few very delicate hyaline casts. Three-quarters of a square inch of urinous film when carefully examined showed three transparent casts, one of which contained four white blood cells (pus corpuscles). On the 10th of September the urine was found free from all trace of albumen, and in half a square inch of urinous film could only discover two hyaline casts, the longer containing two epithelial cells apparently healthy, and three leucocytes, the shorter no epithelium, and but one white blood corpuscle.[1]

[1] Although the urine remained clear when boiled, after acidulation with nitric acid it gave a slight cloud with the delicate carbolic acid test of M. Mehu (*Ar-*

Except during the first two weeks after I began to investigate his case, this patient had no symptom of renal disease, save the constant, although scanty deposit of casts, white blood corpuscles, and epithelial cells let fall every day by the urine, and although suffering from other effects of lead which complicated his case, the kidneys on the 20th of October, when I last heard from him, appeared to have become gradually restored, if not to health, at least to a condition in which they were capable of performing their normal functions.

It is probably in regard to cases such as this that Dr. Beale remarks (*Kidney Diseases and Urinary Deposits*, 1869, p. 344): "Casts containing pus are not common, although some cells agreeing in many characters with the pus globule are not uncommonly present. Of these cells some are no doubt modified cells of renal epithelium, the germinal matter of which is of much larger size than in health, the formed matter of the cell being nearly absent, while others are altered white blood corpuscles (pl. xvii., figs. 93, 94). . . . I have, however, seen many cases in children and adults, where these casts and cells were most abundant, which have been completely recovered." The "altered and growing white blood corpuscles" figured on "pl. xvii." are, I opine, accurate delineations of white blood globules which have become distended by immersion into urine or other fluid of low specific gravity, as described in the early part of this paper, of which it seems to me any one can satisfy himself in a few minutes by simply repeating my experiments.

Recapitulating now the conclusions above reached, it will be seen that while red and white corpuscles occurring as described in the urine, in their normal proportion point to renal hemorrhage, and the same elements when more nearly equal in number indicate an acute or subacute nephritis, the existence of white blood cells (pus, mucous, or exudation corpuscles) *generally* shows a chronic or, at least, less active inflammatory condition of the kidneys: further, that a series of comparative examinations performed with the precautions above-detailed at intervals of a few days affords an important guide to the effect of treatment, and to the progress of the disease; and, therefore, it may be, I think, safely asserted that due regard being paid to the general symptoms and the occurrence of albumen and tube casts in Bright's disease, we can by a careful study of the corpuscular blood elements, as seen in the urine, diagnosticate the form and stage of the renal affection with much more accuracy than it has heretofore been customary to do.

chives Générales de Médecine, Mars, 1869), but not being as yet familiar with the fallacies, if any, to which conclusions deduced from the action of this reagent are liable, I merely note the fact as it occurred, intending to make some future investigations in regard to its value.

ART. V.—*Observations on the Treatment of Certain Complications of Hooping-Cough by Means of the Oil of Turpentine.* By BEDFORD BROWN, M. D., of Alexandria, Va.

PROBABLY no other drug exerts so prompt and universal an influence over the entire secernent system of membranes, as sudorific, diuretic, expectorant, and alterative, as the oil of turpentine. These peculiar powers of the remedy render its action particularly applicable to the treatment of the grave forms of hooping-cough, the more dangerous complications of which affection are, with the exceptions of pneumonia and inflammation of the cerebral substance, generally confined to the mucous surfaces or serous membranes of the brain.

It will be found that torpidity of the renal functions is a marked and important feature of all the more serious forms of this affection. The action of the turpentine, under these circumstances, is that of a decided but safe diuretic, often producing a copious flow of limpid urine to the manifest relief of the general symptoms, whether febrile or irritative.

On the morbid states of the bronchial mucous membrane in hooping-cough, the remedial influence of the turpentine is that of a soothing, but active expectorant, reducing inflammatory action, tranquillizing irritation, and diminishing copious and exhausting discharges.

Over the varied irritations and inflammations of the vast mucous tract of the alimentary canal, which accompany hooping-cough so tenaciously during the hot and malarious seasons, the action of the oil of turpentine is the most permanent in its corrective influence of any other agent in the knowledge of the writer.

The morbid complications of this affection to which the turpentine treatment is more particularly adapted are infantile remittent or gastric fever, a peculiar irritative form of continued fever, bronchitis, hæmoptysis, convulsions, dysentery, and enteritis.

Infantile Remittent Fever.—During the prevalence of hooping-cough, particularly in the hot season, in many cases, an irritation or inflammation of the alimentary mucous membrane is exceedingly liable to arise, attended with sero-bilious or mucous discharges, which at certain stages of such cases passes into a train of constitutional derangements characterized by excessive tympanitis, fever of a low remittent type, exhausting perspirations during the remission, general prostration, muttering delirium, singultus, loaded tongue, and scanty urine. In relieving this train of symptoms the oil of turpentine has proven decidedly efficient.

Bronchial Affections.—In the advanced stages of certain cases of hooping-cough, a subacute form of bronchial inflammation occurs of an exceedingly obstinate character, attended with very copious bronchorrhœal dis-

charge, remittent fever, emaciation, and nocturnal perspirations, frequently so free as to resemble those of hectic fever. The mucous discharge in these cases is so excessive as to endanger the lives of the very young and feeble by sudden asphyxia, while in others the exhaustive process is gradual but progressive. In this class of cases bronchial dilatation, emphysema, and permanent thickening of the mucous membrane are found. For relieving this most obstinate form of bronchial affection, the steady and persevering use of the oil of turpentine has never failed in my own hands.

Continued Form of Irritative Fever.—In malignant epidemics of hooping cough this form of fever is not unfrequently met with. Its leading characteristics are, continued fever, temperature ranging from 102° to 107°, with but little diurnal variations, progressive and great emaciation, an unvarying dry and husky skin, suspension of the bronchial secretions, frequent pulse, constant and busy delirium, constipation, retraction of abdominal walls, inordinate erethism of the nervous system, vigilance, dry and glazed tongue, and scanty urine. This is not the enteric fever of Louis, for it is wanting in its specific local lesion. Neither is it dependent on local inflammatory action, but apparently is due to the poisonous influence of the peculiar infection of pertussis aided by epidemic influences. In restoring the secretions, and relieving the febrile and nervous excitement, the oil of turpentine here, as in the preceding instances, has been efficient.

Hæmoptysis.—Hæmoptysis, if not associated with tubercle, can usually be controlled by the turpentine treatment.

Cerebral Complications.—In congestive and inflammatory affections of the brain the condition of the renal functions will usually be found torpid, occasionally nearly suppressed here as in other instances. To relieve this difficulty the turpentine is the most active agent. When given in these affections in combination with the bromide and iodide of potassium in quantities sufficient to produce decided stimulus to the urinary functions, it constitutes the most successful treatment with which the writer is acquainted Finally the turpentine may, under certain circumstances, be combined with cathartics, other diuretics, mineral or vegetable, expectorants, or sedatives, with advantage, according to the particular requirements of the case.

ART. VI.—*Femoral Aneurism in the Groin successfully treated by Flexion of the Limb, after a Relapse following a previous Apparent Cure by Compression.* By GURDON BUCK, M. D., Surgeon to New York Hospital and St. Luke's Hospital, etc. (Read at the meeting of the Medical Society of the County of New York, Oct. 1869.)

E. W., policeman, æt. 30, native of Ireland; healthy constitution, temperate habits, was admitted into the New York Hospital June 24th, 1867. He stated that about five months ago he first experienced a burning sen-

sation in the right groin after standing four or five hours, which, however, subsided on resting awhile. A physician whom he consulted attributed it to an enlarged gland, and prescribed tincture of iodine and plasters. No benefit followed. On the contrary, the burning sensation slowly and gradually increased, and about two weeks ago he first noticed a pulsating tumour in the groin. The burning sensation became worse at night after a hard day's work. Patient can assign no cause for his ailment. The aneurismal tumour of the size of the butt end half of a hen's egg, is situated over the femoral artery, immediately below Poupart's ligament, pulsates distinctly with a well characterized souffle, and can be obliterated by direct digital compression. Pressure upon the external iliac artery above requires to be made with very considerable force in order to arrest pulsation in the tumour, owing chiefly to the fulness and prominence of the abdominal parietes. In consideration of the moderate size of the tumour, and its recent origin, as well as the healthy condition of the patient, it was decided to employ indirect compression for the treatment of the aneurism. While an instrument was being constructed with which to carry out this plan of treatment, the patient was directed to keep in bed, and apply digital compression three times in 24 hours for 10 or 15 minutes at a time. An instrument constructed after the plan of Dr. Tufnell was tried on the 14th July, but was found inapplicable. In the meantime Dr. C. M. Bell, house surgeon, had devised and prepared an ingenious apparatus, consisting essentially of an elastic steel band two inches wide, bent in a circular form to pass around the body, and well padded behind to bear the counter pressure. In front the ends were joined to a flat bar of iron 18 inches in length, with a slit along its middle. In this slit a rod standing vertically with a compressing pad at one end, was made to move from side to side, and could be adjusted so as to make compression at any desired point. Without further description, it is sufficient to say that this apparatus could be adjusted so as to compress the iliac artery above Poupart's ligament, and arrest pulsation entirely in the aneurism.

On the 16th July at 4 P. M., the above described instrument was applied, and the treatment by compression commenced. From its first application pulsation was arrested in the tumour and in the posterior tibial artery. The temperature of the limb became lower than that of its fellow, and patient complained of pain in the small of his back and numbness of his right leg. The limb was elevated, and a single grain pill of opium ordered every two hours. At 5 o'clock no pulsation in the tumour is perceptible; patient is uneasy and moves restlessly from side to side; limb is icy cold and of a somewhat dusky hue, especially the toes. Ordered the limb wrapped in flannels, and bottles of hot water to the feet.

July 17. Slept little last night, but was comparatively free from pain; took during the night two pills of opium, and had two hypodermic injections of sol. sulph. morph., gtt. x each.

Tumour is without pulsation, feels hard and resisting, and appears diminished in volume. Still complains of numbness of leg and pain in the back, but of none from the pad. The temperature of the limb has risen, though a decided difference between the two limbs still exists. Omit opiates during the day.

18*th*. Resumed opiates last night. Tumour hard and more distinctly circumscribed. A small pulsating artery is felt running over the surface of the tumour. Limb warmer though not as warm as the other. At 4 o'clock P. M. no pulsation in the tumour. Forty-eight hours having

elapsed since the application of the instrument, the pressure was now reduced one-half.

19*th*. Removed the instrument entirely. Still no pulsation; the outline of the tumour can be distinctly defined; it occupies the outer and anterior aspect of the femoral artery. Right limb is a little larger than its fellow, and its temperature still a little lower. Two or three blisters have appeared upon the surface where the compressing pad rested, and several along below the crest of the ilium on both sides where the apparatus chafed the surface.

20*th*. No pulsation in the femoral low down or in posterior tibial artery.

Aug. 28. Sloughing of the skin has taken place where the pad rested, and below the crest of the ilium on both sides, where the instrument chafed. The ulcers consequent upon the sloughing are healing; patient is up and about the ward.

Sept. 12. The ulcers all healed. Patient going about and uses his limb almost as well as ever; the aneurismal tumour, further reduced in size, is of the volume of a marble. No pulsation can be felt in the posterior tibial artery. The right limb remains a little larger than its fellow; its temperature is about normal. Discharged cured.

Relapse cured by Flexion.—The patient was readmitted to the hospital Jan. 14th, 1869, with a return of the aneurism, and stated that since he left the hospital sixteen months ago he has enjoyed uninterrupted good health and pursued his accustomed avocations. Has had no trouble from his limb till within a few weeks, except last summer, when the vessels around the knee became swollen and varicose but unattended with pain, except after long walking. The use of an elastic knee-cap relieved this condition. About eight weeks ago he noticed a peculiar burning sensation in the right groin, at first only felt in the erect position and in walking for a length of time; it was relieved, however, after resting. In the morning and while in the recumbent position it was entirely absent. Accompanying this burning sensation he discovered a feeble pulsation, at first very slight, but gradually increasing. Apprehending a relapse of his former trouble, he retired from police duty and remained at home, spending most of his time in a recumbent position by way of precaution. His general health in all other respects continued good. Three weeks ago he first became aware of the existence of a swelling in the right groin, which he could distinguish by the touch, in the situation of the former aneurismal tumour. It gradually increased till it attained its present condition, and became visible upon the surface. It is situated as before, over the femoral artery immediately below Poupart's ligament, rises visibly above the surface, and is equivalent in volume to the butt end half of a hen's egg. It is soft and can be easily obliterated by digital compression. It pulsates with a distinct aneurismal souffle. Deep digital pressure immediately below the tumour arrests the pulsation, but the firmest pressure above the tumour makes no impression, nor can the pulsation of the iliac artery itself be distinguished at this point. By flexing the thigh upon the trunk to its extremest degree, pulsation in the tumour was found to be temporarily arrested, a less degree of flexion reduces the force of the pulsation, and at the same time softens and diminishes the plumpness of the tumour, causing it partially to collapse. No œdema or other swelling is observable in the limb. The effect of flexure upon the tumour thus ascertained, suggested the mode of treatment which was decided upon, and was instituted as follows: Over the patient lying in bed upon his back, a

frame was arranged, from which two bands of canvas four inches broad suspended in loops, were made to support the leg flexed upon the thigh, the thigh itself being also flexed upon the trunk. This arrangement proved extremely irksome by confining the patient to one position upon his back, and had to be abandoned after twenty-four hours' trial. The patient himself being intelligent and willing to co-operate in carrying out any plan of treatment, the following arrangement was substituted. A broad bandage was applied, embracing the lower part of the trunk and the thigh close to the knee, so as to maintain flexion and allow the patient to vary his position at pleasure. He was enjoined also to increase the flexion of the thigh to its utmost degree, and maintain it as long at a time and as often as he could endure it. This method was put in operation on the 15th January, and continued without interruption.

Jan. 21. On careful examination, the limb being extended, the tumour was found to have diminished in size, and become firm and no longer to be capable of obliteration. Its most prominent part was more yielding under pressure than elsewhere; pulsation was feeble, and a faint souffle only perceptible.

Feb. 1. A gradually progressive improvement has taken place. The tumour is still further diminished in size, and the pulsation abated in force. The souffle is only feebly perceptible. The bandage is removed and patient allowed liberty of position, but still required to remain in bed.

4*th.* Patient is allowed to be out of bed, but not to walk about.

6*th.* The improved condition of the aneurismal tumour being sustained, the patient is allowed to go about the premises.

17*th.* The tumour is scarcely perceptible on the surface; it is firm and unyielding. From the commencement of the treatment a process of consolidation appears to have been gradually and progressively taking place in the tumour, affording every indication of a permanent cure; patient was to-day discharged to return to his home, and was enjoined to live quietly and exercise moderately, to be observant of the progress of the tumour in the groin, and report himself for observation from time to time.

Sept. 10, 1869. Patient's condition this day is as follows: The tumour in the right groin is no longer visible upon the surface; it has shrunken to a flattened, hard mass, less than half its original size. All abnormal sound has disappeared; a feeble pulsation which the patient thinks he feels may be communicated to the tumour by the subjacent artery. After a long walk he still has some remains of the former burning sensation in the groin, which, however, disappears on resting.

Oct. 18. Patient was presented for observation at a meeting of the County Medical Society. For a fortnight past he is confident there has been no pulsation in the tumour. In other respects his condition is as above reported.

Remarks.—The successful employment of flexion in the treatment of aneurism is of quite recent origin. In September, 1858, Dr. Theodore Maunoir, of Geneva, Switzerland, reported a case in the *L'Echo Médicale*, of Neuchatel, treated by himself in June of 1857. In examining his patient with popliteal aneurism, Dr. M. ascertained that flexion of the leg upon the thigh arrested pulsation in the tumour. He thereupon endeavoured to cure the tumour by maintaining permanent flexion of the limb, for which

purpose he first had made a sort of laced cap, which his patient was unable to endure. He then substituted a sort of sling which passed from the shoulders and supported the leg in a flexed position. After wearing this for about twenty days, his patient finding that the tumour had diminished in size, laid it aside and disappeared from notice. One year after Dr. M. had an opportunity of examining the patient, and found the tumour reduced to the size of a pigeon's egg, hard, free from pulsation, and to all appearance permanently cured.

In April, 1859, Mr. Ernest Hart, Surgeon of St. Mary's Hospital, London, reported before the Royal Medical and Chirurgical Society, a case of popliteal aneurism successfully treated by flexion, in 1858, and published it in the 42d volume of the Society's *Transactions*. On the 28th of January, 1862, Mr. Hart reported before the same society other successful cases treated by himself and other surgeons. On the same occasion, Mr. A. Shaw communicated a successful case of popliteal aneurism treated by flexion. The whole number of cases amounted to nine, of which eight were popliteal aneurisms, and one a traumatic aneurism of the radial artery. A few other cases, all popliteal aneurisms, are met with in succeeding volumes of the *London Lancet* and *Medical Times and Gazette*. This method is, from the nature of the case, restricted in its application to the treatment of aneurisms of the extremities, situated at the flexures of the joints. According to Lefort, *Dict. Encyclopédique des Sc. Med.*, Art. Anévrisme, p. 602, Paris, 1866—"Up to the present time, flexion has only been employed successfully in the treatment of popliteal aneurism, and aneurism in the fold of the elbow." Our case may, therefore, claim a place in the records of surgical science as a new achievement of this new method. In regard to the *modus operandi* of flexion we may suppose that it acts first by direct compression of the aneurismal tumour itself, and second by indirect compression of the artery on the cardiac side of the tumour through the medium of the tumour itself: chiefly, however, by the indirect compression of the artery, which either retards or completely intercepts the current of blood going to the sac, according to the degree of flexion maintained. In the case herein reported, pulsation in the tumour could only be completely arrested by the extremest degree of flexion, and that could only be tolerated for a very short time. It was, therefore, mainly by diminishing the flow in the sac that the deposition of laminar fibrinous clots was promoted, and a permanent obliteration of the sac ultimately effected. The complete arrest of pulsation during the treatment could only have been intermittent in this case, and that only for a short time at once; it being left to the discretion of the patient to urge the flexion to its utmost point, as he was able to endure it. Though restricted in its application, this method is certainly entitled to be regarded as a valuable addition to our resources in the treatment of this formidable disease, especially as it is unattended with the dangers incident to the

treatment by ligature, and as it is shorter in its duration, and accompanied generally with much less pain in its employment than the treatment by indirect compression. Within its own sphere it ought always to have a first trial, inasmuch as it can never, though found inapplicable, prevent a resort to other methods. We may further remark some interesting points in the antecedent history of this case prior to its treatment by flexion.

The relapse of an aneurism after its apparent cure by the ligature, is not a very rare occurrence; it is much rarer, however, after treatment by compression. In both cases the relapse is to be attributed to the fact that the clot filling the aneurismal sac after the occlusion of the artery, fails to undergo a transformation into fibrinous clots, by which alone a permanent obliteration of the aneurism can be effected. Sooner or later the circulation re-established through collateral channels disintegrates the soft clot and the aneurism is reproduced. That a relapse should take place after treatment by compression is to be attributed to the immediate and complete occlusion of the artery by the too firm application of the compressing pad at the outset of the treatment, the effect of which is to produce the same condition in the aneurismal sac as follows the application of the ligature. In both cases instantaneous arrest of circulation in the sac is followed by the formation of soft clots, and in both cases the same liability to relapse ensues. This explanation holds true in the case now under consideration. The compressing apparatus, it will be remembered, arrested pulsation in the tumour from the moment of its application up to the time of its removal. It is, however, a remarkable exception to the common rule, that so long an interval as fourteen months should have elapsed after its apparent cure before the reproduction of the aneurism.

ART. VII.—*Permanganate of Potassa in the Treatment of Certain Female Diseases.* By A. M. WILLIAMS, A. M., M. D., of Springboro', Crawford County, Pa.

I DESIRE to call attention to certain uses of permanganate of potash, which, so far as I am aware, have not been alluded to by writers. This salt has of late received favourable notice in the journals, and is certainly one of the most valuable articles of the materia medica to the surgeon. From my own experience I am led to believe that it may likewise be made of great value to the obstetrician and gynæcologist. The cases in which I have found it most useful have been those of *excessive purulent* and *prolonged lochial discharge.*

A year ago I was called to see a woman who had been confined about two weeks previous to my visit. She was a primipara, small, and of strumous

constitution. The person who attended her during labour was a homœopathist. The labour seems to have been an easy one; the lochia was more than usually abundant, and on the fifth or sixth day it became purulent and highly offensive, growing more so continuously until I was called. The patient and her husband became much alarmed, and sent for the doctor who had attended her, but were assured that nothing could be done; that it would cease in time, and that interference would be positively dangerous. On my first visit the discharges were so indescribably offensive that no one could long endure to remain in the room. With a view chiefly to remove this, and for purposes of cleanliness, I ordered a solution of permanganate of potash grains 10 in a pint of tepid water, to be used by injection, copiously, twice a day. In two days I made another visit, found all the stench removed, and the discharges not only natural in appearance, but far less copious. The treatment was continued two days longer, and the patient was pronounced cured.

The happy manner in which the salt acted in this case induced me to try it further in similar cases, and always with like results. I had used it, however, with a view only of destroying the fetor, but I observed not only a speedy change in the character of the discharge, but a marked diminution in the *quantity*. This led me to presume that in simple cases of *excessive lochia* it might be of service. I regret that I have not had more abundant opportunities for testing this, and will only say that in two cases of prolonged and excessive discharge that have recently come under my notice, the use of this agent was followed by very speedy relief. Now many of our authors claim that these prolonged discharges are the result of ulceration, either within the neck or on the os, and Cazeaux, among others, advises the use of the speculum and application of nitrate of silver. Whether they be justly ascribable to these ulcerations, as a rule, I do not know, having never resorted to the speculum to ascertain. But I doubt if the profession has generally accepted the theory. So far as my knowledge extends, physicians usually rely upon astringent injections, without the use of such unpleasant means as the speculum and caustics, and I believe their success is usually good. I am satisfied, however, that permanganate of potassa will be a valuable adjuvant to the treatment, if not sufficient alone to effect a cure more speedily than any other remedy. And even though some ulcers exist, I should not feel very doubtful of speedy success. This agent is well known to act most happily in promoting the healing of ulcerated surfaces. Indeed, in one case of ulceration of the neck, which had proved obstinate in the hands of another practitioner, the patient being a non-pregnant woman, I suggested to him the propriety of trying permanganate of potassa. He did so, and assured me that he was highly gratified with the results obtained. I trust that others may think it worth while to make use of this article in these and similar cases, and publish the results of their investigations.

ART. VIII.—*An Additional Test for the Diagnosis and Correction of the Optical Defects of the Eye.* By WM. THOMSON, M. D., Assist. Surg. to Wills Hospital for Diseases of the Eye, and late Assist. Surg. U. S. A.

BEFORE any object can be seen distinctly, the rays of light which are emitted or reflected from it, must be so refracted by the cornea, lens, and humours of the eye, as to cast upon the layer of the rods and cones of the retina its inverted and perfectly defined image.

If the eye be regarded as an optical instrument composed of a refracting apparatus, the cornea and lens, and a receptive screen, the retina, it needs no argument to prove that there must exist a harmony between the refractive power and the antero-posterior axis, to secure perfect definition.

The human eye may be thus described as a camera of one inch in length antero-posteriorly, with refracting surfaces which are equal to a lens of one inch in focal length: and only when the rods and cones of the retina are situated precisely at the principal focal point of the refracting combination, do the images of distant objects fall upon them, so as to be fully appreciated by the brain. Any variation in the length of the visual axis, without a corresponding change in the refractive apparatus, would render the retinal images indistinct, and would result in imperfect vision.

It may be considered as demonstrated by actual measurement, as well as by mathematical analysis, that the length of the visual axis does frequently depart from the normal standard, and that to this mechanical and anatomical fact, the defective vision in such instances may be ascribed. To the eye whose refractive system and visual axis harmonize, Donders has given the name Emmetropic, and to the eye which departs from this happy construction, Ametropic.

The ametropic eye may have a visual axis either too long, when it becomes Myopic, or too short, when it is called Hypermetropic. In myopia, the retina is too remote from the cornea and lens, and the images of distant objects are formed before it, and are indistinctly seen: its point of perfect vision is at a finite distance, which may, in extreme cases, be placed at one or two inches only anterior to its cornea. In hypermetropia, the axis is too short, and the images would fall behind the retina; objects are clearly seen, only when the refracting power of the crystalline lens is increased by a contraction of the ciliary muscle, and the focus of the refracting combination thereby shortened, to correspond with the diminished antero-posterior axis.

The following table will express numerically these diversities, as ascertained by the best authorities:—

Emmetropic.	Average length of axis			.	.	.	22 millimetres.
Myopic.	"	"	"	.	.	.	25 "
Hypermetropic.	"	"	"	.	.	.	20 "

Astigmatism is but a further subdivision of ametropia, in which one or both of the simpler forms may be found in the same eye, which may then be emmetropic in one meridian, and myopic, or hypermetropic, in the other; or myopia and hypermetropia may coexist in the same eye, in meridians at various angles to each other.

To diagnosticate and correct the impaired vision caused by these forms of ametropia, the method usually employed clinically, is to place before the suspected eye various convex, or concave, spherical, or cylindrical, glasses of known focal length, and to direct the patient to examine with them certain test-types, those of Snellen being usually preferred, which are composed of letters of such sizes as to present angles of 5′ at the distances at which they are intended to be seen.

As the power of refraction and length of axis are in the proper proportion in an emmetropic eye, any convex or concave glass must diminish its visual power: as the refraction is too great in myopia, its reduction by concave glasses improves vision: as the refraction is too low in hypermetropia for its short axis, convex glasses, by increasing it add to the visual power; and in describing these defects the power of the glass, whether convex or concave, which gives the best definition, is used to designate the degree of ametropia.

The ophthalmoscope is also usefully employed to ascertain the state of the refraction of the eye, by examinations which are fully described in the text-books on ophthalmic surgery.

Usually, a full assortment of test-glasses are required, and with them, and the test-types, a series of careful observations must be made to ascertain the presence and degree of ametropia; and as an addition to these methods, or when the apparatus above mentioned is not at hand, it is hoped that the simple test below described may be of service to those interested in this branch of surgery.

Let the reader take any strong convex lens, say one of six inches in focus, and standing at ten feet distance from a gas-light or lighted candle, project upon a piece of ground glass, held between the eye and the light, an image of the flame, which will be seen, inverted and distinct, when the screen is a little beyond six inches from the lens; a circle of light replaces the image, increasing or diminishing in size, as the lens is moved to or from the screen. Now cover the lens with a piece of cardboard having two circular apertures in it, each $\frac{1}{4}$ inch in diameter, and $\frac{3}{4}$ inch apart, and two spots of light will appear on the screen when the lens is moved within or beyond its focus, becoming more distinct as this point is approached, and uniting into one distinct image of the flame at the proper focal point. The least movement from this point, will cause the image to become double; and by this it is known that the screen is not placed at the point to coincide with the refractive power of the lens, or, in other

words, that the axis or distance from screen to lens is not harmonious with the refracting power.

This is precisely the condition of the ametropic eye, and by the simple test described below, its retina is enabled to perceive the double images it produces.

For this purpose a disk of sheet brass 1½ inch in diameter may be placed directly before the eye, having in it, at a distance apart of ⅛ inch, two perforations, each $\frac{1}{32}$ inch in diameter. When the eye regards a gas-light distant twenty feet through these perforations, two circles of diffused light are perceived at the disk, which overlap at their inner margins, and produce a bright elliptical space. Should the eye be emmetropic, the gas-light will be seen in the overlapping space, clearly defined and *single;* but if either myopia, hypermetropia, or astigmatism be present, *two* lights appear, but only where the circles overlap.

A card with two pin-holes one-eighth of an inch apart will enable any one to see the double images, after making himself myopic or hypermetropic artificially, by a concave or convex glass (preferably, however, a convex), through which he may look at a candle or gas-light, at a distance of ten or twenty feet, observing that the greater the distance from the object, the more marked will be the separation of the images.

So striking is the double vision thus produced, that a glance through the double diaphragm is sufficient to indicate any ametropia; and so exact is the test that with my own eye, corrected, and with relaxed accommodation, a concave or convex $\frac{1}{72}$ doubles the light; and my friend Dr. Wm. F. Norris, who is familiar with the subject of refraction, can detect a myopic astigmatism in one eye of a $\frac{1}{60}$ by the same means.

Having now ascertained that ametropia is present in any case, it will be requisite to know whether it arises from myopia or hypermetropia, and the following test will suffice. Draw through the two perforations a line, and holding the disk before one eye so that this line shall be horizontal, cover the right hole only with a piece of thin red glass, and if myopia be present a red flame will stand on the right side, and an uncoloured one on the left; but if hypermetropia exist the red image stands on the left, the uncoloured one on the right side. In myopia the double vision is direct or homonymous, in hypermetropia it is crossed.

By the rotation of the disk so that the line through the holes is carried from the horizontal to the vertical meridian, any existing astigmatism becomes apparent. In a case recently examined of myopic astigmatism of one-sixth in the horizontal meridian, the vertical being emmetropic, there was but a single image seen when the holes stood one above the other, but widely separated double ones when the holes were placed side by side.

It is evident that a correction of the visual defect can be made with the gas-light, since it only requires that the ordinary test glasses should be placed before the eye, armed with a double diaphragm, observing that in

hypermetropia concave glasses separate the images and that convex make them approach, until, when the eye is perfectly corrected, they unite into a single sharp image. The reverse obtains in myopia, the convex separating, and the proper concave, fusing them into one.

Should it be found difficult to fix the attention of children or unintelligent persons upon the overlapping space where alone the double images must be sought for, a number of openings may be used through which the object will be multiplied in proportion to the number of perforations which occupy the space of the pupil, and a disk of perforated Bristol-board has been found to answer very well in such instances.

There is one positive advantage over the test types which this method possesses, since the acuteness of vision does not enter so largely into the problem, and an eye of low visual power may be diagnosticated and corrected, so long as it can perceive a bright spot of light, and even an amblyopic eye can thus be examined if necessary. A patient was recently examined by the writer, who for several years past had been using concave glasses of $\frac{1}{15}$, there was entire loss of vision in one eye, and a decided nuclear opacity in the lens of the other, which prevented an examination by the ophthalmoscope to ascertain either the condition of the retina, or the state of the refraction. The acuteness of vision was $\frac{1}{12}$ only, and it was important to know in view of a possible operation whether the degree of myopia was really so great. She could easily perceive the test light, and it was found by the double holes that no glass would fuse the double images, but one that was equal to that which she had been using for some years.

To obtain a better and more steady object than a flame, I have used a disk of card-board nine inches in diameter, which is attached to a gas-burner so that it will rotate upon a pivot placed through its centre, on one side of which a slit four inches in length, and $\frac{3}{8}$ inch in width has been cut, and on the other, a circular perforation $\frac{3}{8}$ inch in diameter, both covered with tissue paper. These appear as a bright band and circular spot of light, having sharp outlines, and each subtending at twenty feet an angle of 5′. For astigmatism the band can be placed at any angle by rotating the disk, and when so used the two small perforations should be placed before the eye at right angles to the direction of this band.

Having now described in detail the use of a double perforation, it remains to show that from the same causes, an ametropic eye can be recognized by a single perforation in the diaphragm; for when a bright point is garded by such an eye, and the disk with the single opening held close to the cornea is moved rapidly, the light will appear to dance, to an extent which will depend on its distance from the eye, and on the degree of the ametropia. The single diaphragm is useful as a check upon any other method of correction, for until all ametropia is removed by proper glasses,

the point of light will continue to dance or move in some one or other direction.

These observations will all hold good for myopia, but for hypermetropia, I wish it to be understood that they presuppose a relaxation of the accommodation.

The power of accommodation seems, however, to be to a certain extent neutralized when the eye looks through these small openings, and in three individuals specially examined for this purpose, it was found to be reduced from a $\frac{1}{4}$ to $\frac{1}{11}$ in one, and from $\frac{1}{4}$ to $\frac{1}{24}$ in the other two, as tested by the ability to fuse the double images at twenty feet through concave glasses. Further clinical observation will be requisite to ascertain this point so important in the recognition of the degree of hypermetropia.

To enter upon the discussion of the optical laws by which these various effects are produced, would extend this paper beyond its allotted space, as would likewise any complete history of the observations of others, although it may be said that Scheiner, in 1619, described the effect of a screen with two slits in causing double images of an object when placed within the point of perfect accommodation; that upon the same law optometers have been constructed by Young, Stampfer and others, and that Helmholtz, in his *Physiological Optics*, explains the use of such diaphragms, to ascertain the near point, in his discussions on the range of accommodation.

As a ready means, however, of recognizing and correcting ametropia, for which it is proposed above, it is hoped that it may be found to possess some clinical value.

1607 LOCUST STREET, PHILADELPHIA.

ART. IX.—*New Observations on Dr. E. Groux's Case of Congenital Fissure of the Sternum.* By HENRY HARTSHORNE, M. D., Professor of Hygiene in the University of Pennsylvania.

DURING the late meeting of the American Association for the Advancement of Science, at Salem, Mass., a special *séance* was held, for the repetition, by Dr. Upham and Mr. Farmer, of some remarkable experiments upon Dr. Groux; manifesting, by the aid of electrical apparatus, the main peculiarities of his case. A subsequent opportunity occurred to the writer to make a close and particular examination, which, with the perusal of the documents now accumulated concerning the case, suggested some remarks. Although Dr. Groux, both before and since his entrance into the medical profession, has, in his extensive travels, made his case known to a very great number of medical men, yet in proportion to its importance it has

not had a large place in medical literature, especially in the journals of this country. Ten years ago M. Groux visited Philadelphia, and, as the result of his examination, Dr. DaCosta communicated to the Pathological Society a valuable paper.[1] Since then the apparatus of Dr. Upham and Mr. Farmer has been perfected, and some very important observations have been made, well worthy of the attention of physiologists and physicians. I have deemed it not improper, therefore, to endeavour succinctly to bring the history of the case down to the present time.

In regard to the rarity of the case, I am indebted to Dr. Upham for some additional references, collated by Dr. R. M. Hodges, of Boston; the paucity of which, with those previously known, will show how nearly the case approaches to being actually unique. This character is obvious as regards the present generation, from the fact that no one of the more than two thousand physicians in Europe and in this country, who have examined the case, has met with its parallel. The only examples of any near resemblance to it, yet pointed out, appear to be the following:—

Harvey's case, of a young nobleman, whose heart was exposed by fracture of some of the ribs upon the left side, and destruction of the soft parts by ulceration. Cullerier's case, presented in 1821 to the French Academy of Medicine;[2] that of a woman who had reached the age of 31 years, without inconvenience from a congenital deficiency of almost the whole of the lower half of the sternum. Dr. J. H. Bennett's reported *post-mortem* inspection of a case, whose previous history was not known.[3] That of Dr. Lyons, of Dublin, occurring in a boy deformed by lateral curvature of the spine, with deviation and imperfection of the ribs upon the left side, showing the movements of the heart.[4] A child presented when ten days old to the Société de Chirurgie, by M. Marjolin,[5] in which a continuous line united the clavicles, the sternum being *bifid* and almost absent. Case reported by Dr. Louis Benjamin, of a child in which the sternum was substituted by two long narrow cartilaginous bands, from the clavicles to the seventh ribs.[6] A case recorded in 1839,[7] of a child born feeble, with distressed respiration, with entire absence of the sternum. It probably was short-lived. A child thirteen years old, mentioned in the tenth volume of the *Brit. and For. Medico-Chirurg. Review* (p. 257), and one cited in the *Gazette Médicale*, Aug. 7, 1841 (p. 497), from a description by Monod and Cruveilhier, in 1841. A German, who, at the age of 22, was found on examination for military service to have almost

[1] Trans. of Phila. Pathol. Soc., vol. i. p. 203.

[2] Journ. Gén. de Méd, t. 74, p. 305.

[3] Monograph by Dr. E. Groux, upon his own case. Hamburg, 1859.

[4] Ibid. [5] Gazette des Hôpit., Aug. 3, 1858.

[6] Am. Journ. of Med. Sciences, N. S., vol. xxii. p. 209; vol. xxiv. p. 488; from Zeitschrift für die gesammte Medecin.

[7] Archiv. Gén. de Méd., 3me serie, t. ix. p. 81.

entire deficiency of the sternum. He enjoyed good health, and followed the business of a musician.[1] A case of partial sternal fissure, reported by Dr. A. M. Slocum,[2] to the Phila. College of Physicians, July 7th, 1859. Of all of these, probably the greatest resemblance to that of Dr. Groux was in the case brought forward by Cullerier.

Some diversity of opinion has always existed in reference to the medical anatomy of M. Groux; as to the precise nature of the visibly pulsating tumour in the sternal fissure. The majority of names has been attached to the view that this pulsation belongs to the *right auricle*. So pronounce, among others, Forget, of Strasbourg, Béclard, Aran, Piorry, and Pouchet, of Paris; Pavy, C. J. B. Williams, J. H. Bennett, and W. T. Gairdner, of Great Britain; Upham and Da Costa, of this country. To the opinion that it is the *aortic* pulsation that is felt, subscribe Bouillaud and Marc D'Espine. That it is the *right ventricle*, Jas. Paget, W. Baly, Traube, and Virchow. The last named, however, upon a second examination with the aid of Dr. Upham's apparatus, was induced to modify his judgment. The late Dr. J. Snow, of London, believed the pulsation to be due to a *regurgitation* from the right ventricle into the auricle. Dr. Francis Sibson considers that the aortic pulsation is seen during inspiration, and that of the right auricle in expiration. Dr. J. Hysern, of Madrid, believes the right ventricle to form part of the tumour.

One of the points of greatest interest to determine by examination of this case is, that of the synchronism or succession of the movements and sounds of the different cavities of the heart. To an exact investigation of this Dr. Upham has devoted attention with gratifying success.[3] With the aid of Mr. Farmer, of Boston, the *sphygmophone* was devised, by which, sounds being produced by the striking of bells upon the breaking of magnetic circuits, through the rising of fluid in tubes, the *ear* was enabled to trace distinctly the succession of the impulses, of the auricle, left ventricle, and aorta. Afterwards, by the application of Bond's registering chronograph, Dr. Upham was enabled to measure the *precise interval* occurring between the auricular and ventricular, and again between the latter and the aortic movements. Taking the whole duration of a pulse-beat and interval as 1000, the commencement of the beat proceeding from the medio-sternal tumour being .000, the interval to the apex beat was found to be .038; to that of the ascending aorta, .160; that of the radial artery at the wrist, .235. The sphygmophonic experiments were satisfactorily repeated before the members attending the late Scientific Convention at Salem; the same general facts being also ocularly demonstrated by the rising and falling of liquids in tubes placed respectively over the

[1] London Med. Gazette, Nov. 8th, 1844; from Medicinische Zeitung, No. 10, 1844.
[2] Am. Journ. of Med. Sci., N. S, vol. xxxviii. p. 406.
[3] See Boston Medical and Surgical Journal, 1859.

aorta, apex, and medio-sternal tumour.[1] The introduction, by these observations, of the elements of certainty and numerical precision into the inspection of the movements of the heart and great vessels, appears to the writer to be an important contribution to the study of the physiology of the circulation.

A few words may suffice to express the reflections and conclusions induced by my own inspection of Dr. Groux, and consideration of the history of his case.

First, as to its regional anatomy; is it the right auricle only that lies, visibly pulsating, in the sternal fissure? The dissenting opinions, though so largely in the minority, are not to be passed over without some attention. Jas. Paget, W. Baly, and Traube, of Berlin, pronounced it, as we have seen, to be the right ventricle; and Virchow at his first view of the case did the same. It is true that the changes connected with the cessation of respiration and circulation may make an essential modification in the relative position of the thoracic organs after death. But the limits of percussion-dulness, as well as those of the greatest distinctness of the cardiac sounds compared with the known *dimensions* of the heart, and the site of the impulse during life, would seem to show that the right ventricle must be partly exposed in the fissure. How much of it, is the question; and what part does it take in the visible pulsation? By means of feathers made to adhere in the erect position over different portions of the space under inspection, Dr. Groux exhibits beautifully the movements, shown to be not the same above and below. In the middle of the tumour the feather undergoes a sort of *gyration*, tilting first downwards and towards the left, then to the left, upwards, upwards and to the right, directly towards the right, and lastly a little downwards towards the right, by easily traced and gradual succession. Below, when the heart is forced downwards by a deep inspiration, the feather is made to move only in one direction, inwards or downwards and to the right; this movement following the former (at least in its commencement) by a very short interval. A noticeable fact is the *distension* of the medio-sternal tumour, with marked dulness on percussion, when Dr. Groux "holds his breath," without any other effort. This is quite a distinct phenomenon from the enlargement produced *above* the tumour by speaking or coughing, which is obviously from protrusion over the base of the heart, of a portion of one or both lungs.[2]

This dilatation on interference with the pulmonary circulation seems to be one of the most positive evidences of the auricular character of the visible pulsating tumour in the fissure. But it does not exclude the

[1] This last corresponds with the sphygmoscope of Dr. Scott Alison.

[2] The degree or amount to which this protrusion occurs has been thought by some to favour the *expiratory* theory of emphysema.

idea that it is partly ventricular also. Probably, I think, this is its character. Dr. Lionel S. Beale has given precisely this opinion.[1] We are, perhaps, too much prepossessed by anatomical considerations with the expectation of abrupt difference or separation between the parts or acts of the cardiac contraction and dilatation. Separation and distinct succession of the *sounds* do not prove this abruptness to exist in the mechanical movements, because the sounds have modes of causation not altogether identical or co-existent with the muscular action of the heart. I consider that the most positive lessons of Dr. Groux's case are, first, as shown most completely by Dr. Upham's and Mr. Farmer's experiments with the sphygmophone and chronograph, the *non-synchronism* of the auricular, ventricular, and aortic movements; secondly, the *gradual* nature of the transition from the one motion to the other. As Dr. Forget expresses it especially in regard to what he regards as auricular: the motion takes place "mollement, sans brusquerie;" "ondulant, *sans saccades.*"[2] A writer in the *Lancet*[3] uses this language: "The diastole and systole are alternate, but not of that steam-engine-piston character, up and down, as is usually thought." On the whole, it appears to me that the first part of the motion of the medio-sternal tumour in Dr. Groux, that which makes the first signal of the sphygmophone, is auricular, from the entrance of blood from the venæ cavæ into the right auricle; that this is followed by the "vermicular"[4] contraction of the auricle, succeeded, *not suddenly*, by the contraction of the right ventricle, which concludes the feather-movement or gyration above described. The contractions of the left auricle and left ventricle are, most probably, under normal circumstances, synchronous with those of the corresponding parts of the right heart. The *lowest* feather-movement perceptible would seem to belong alone to the right ventricle, and appears to me to indicate that the ventricle in contracting moves or falls away *from* the middle wall of the chest. In the language of Dr. C. J. B. Williams, "It is a movement of retraction, because the systole of the ventricle withdraws it from the surface."[5] So far I regard it as confirming the observations of Dr. Pennock, made many years ago, showing that the heart is *elongated* as well as twisted during its systole.

Concerning the sounds, the most remarkable fact in Dr. Groux's case is the presentation of a *single* sound when the stethoscope is placed, without much pressure, over the (supposed) auricular portion of the tumour.[6] Dr.

[1] Observations, &c., by Dr. E. Groux, 2d ed., Hamburg, 1859, p. 3.

[2] From Gazette Médicale de Strasbourg, in Dr. Groux's *Abhandlungen und Notizen*, &c., Hamburg, 1857.

[3] June 23d, 1855.

[4] M. Forget, *loc. citat.*

[5] Observations, &c., by Dr. Groux, p. 5.

[6] The word *tumour* is used for convenience, without being precise. No tumescence exists except at the moment of the visible pulsation.

R. D. Lyons, of Dublin, speaks of this as giving "a single sound and a single impulse."[1] Dr. C. J. B. Williams calls it "a distinct sound, accompanying the commencement of the auricular contraction, and ending in the less abrupt and more distinct sound of the ventricular systole."[2] Dr. Da Costa observes that it is not always alike, but may be described as one continuous sound, whose commencement is different from its close. He remarks also upon a peculiar click heard at its termination, ascribed to the drawing away of the integument from the end of the glass stethoscope which was used. With a different instrument I did not hear this click. Dr. C. J. B. Williams also refers to a *duplication* of the second sound, occasionally heard over the upper aortic portion of the fissure. He is no doubt right in explaining this by the non-synchronism of the valvular sounds of the aorta and pulmonary artery. Usually, however, these are synchronous.

Now, as to this single "auricular" sound—to my own ear it was very distinct and continuous, and by using two stethoscopes it was easily contrasted with the double ordinary succession of sounds, first and second, over the aortic region. Is it auricular only? Let me quote Dr. Da Costa's words upon this:[3] "I confess, although it is heard exactly over the seat of what may be presumed to be the auricle, that I am by no means fully convinced that it is caused by the movements of the auricle or of the blood in it. I am not quite sure that it is not a valvular sound produced at the tricuspid orifice, and heard so distinctly, because, owing to the malformation, the stethoscope can be placed directly over, or quite near to the seat of its production." With the view here suggested I am quite prepared to coincide. The sound in question was very faint, if perceived at all, at the commencement of the rising of the pulsating tumour. Placing a finger over the apex of the heart, while the ear received the sound by a stethoscope over the auricle, *no* interval could be apprehended by me between the maximum of the sound's force, at or near its close, and the impulse of the apex. That is, the main portion of the *sound* over the auricle *followed* the *impulse* of the same, and *coincided* with the *ventricular* systolic impulse. This is confirmed by the language used by some of the distinguished authorities already quoted, concerning this case. Says Jules Béclard:[4] "The right auricle forms across the soft parts a tumour, the maximum *diminution* of which is synchronous with the shock of the heart against the pectoral walls." M. Aran,[5] "the isochronism is perfect between the collapse or *contraction* of the auricle and the enunciation of the first sound by the person who auscults." The Committee of the New

[1] Observations, &c., by Dr. Groux, p. 4.
[2] Med. Times and Gazette, Nov. 28, 1857.
[3] Trans. Pathol. Society of Philada., *loc. citat.*
[4] Observations, &c., by Dr. Groux, p. 2. [5] Union Médicale, 28 Mars, 1855.

York Pathological Society[1] reports that "the *contraction* of the tumour is synchronous with the impulse of the heart, at the level of the fifth rib."

I would hold, then, that in this continuous sound we must distinguish, mentally, two portions. The first and least of these may be believed to be auricular, owing to the rush of blood from the venæ cavæ dilating the auricle; this being followed at once, without interval, by its contraction. In a cardiographic record of the movement of the auricle in Dr. Groux's case, inscribed by Marey in that gentleman's Album, there are two waves of ascent; the first of much the greatest height, the second being followed by an abrupt and considerable descent. The first would be referred by me to the dilatation of the auricle by the influx of blood from the venæ cavæ, the second, to the alteration of the form of the same cavity as it contracts. The properly auricular sound is, I believe, mainly a *bruit d'ecoulement*, most intelligible in view of the observations of Savart, Plateau, and Maurat[2] upon the demonstrable vibrations accompanying the movement of all fluids, even when occurring in one uniform direction and in smooth tubes. But the main portion of the sound referred to I must believe to be the *first sound of the heart*, from the ventricular systole, closing the tricuspid valve; identical, therefore, with the first sound as heard, at greater distance, over the apex or aorta. Why do we not hear the second sound also over the auricular tumour? As we do hear it, over the same region, in the presence of the sternum in ordinary subjects, its absence in Dr. Groux's case was certainly a surprise. But it appears to me that the following explanation may be sufficient. Commonly the sternum, perhaps both by its physical resistance and by its influence upon the sonorous vibrations of the cavities of the heart, causes a blending of the auricular sound with that of the ventricular systole, so that the former is individually lost. At the same time the sternum conducts the *second* sound to the ear, wherever it may be placed so as to hear the first. This bone being absent in Dr. Groux, we find that the auricle does not receive the second sound through the ventricular walls, or through the blood which it has just propelled, so as to be audible. Placing the stethoscope a little further to the left, or below, over the ventricle, the second is heard with the first sound. On reflection, I think we will find that this is what might be expected, if the commonly accepted explanation of the second sound is correct, viz., that it is produced by the closure of the semilunar valves under the arterial rebound following the systole of the ventricles. The separation of the first sound, over the auricle, from the second, seems also to confirm the view that this sound is directly connected with the closure of the auriculo-ventricular valves. As suggested by Dr. Hysern,[3] we might designate the first sound as being *ventriculo-*

[1] Drs. Peaslee, Dalton, and Metcalf.

[2] Revue des Cours Scientifiques, 3 Juillet, 1869, p. 490 *et seq.*

[3] Commission of the Central University of Spain, on Dr. Groux's case, July, 1856.

valvular, and the second as *arterio-valvular* in origin. I would repeat, then, that the auricular *impulse*, visible to the eye, and made audible by Dr. Upham's sphygmophone, is, at first and mainly, a movement of *dilatation* of the auricle; that this is attended or followed at its *close* by the auriculo-ventricular *sound*, the first sound of the heart, which is thus synchronous with the impulse of the heart's apex against the walls of the chest.

It may interest many members of the profession to know that Dr. Groux is now practising medicine in the town of Williamsburg, in the State of New York. With that commendable regard for the scientific interest of his conformation which he has always shown, his will, a copy of which is in the possession of Dr. Upham, of Boston, provides for arrangements by which, in case of his death in any part of this country, a complete autopsic inspection shall be made, for comparison with the now so well-known history of his case.

ART. X.—*On Instantaneous Rigor, as the occasional Accompaniment of Sudden and Violent Death.* By JOHN H. BRINTON, M.D., Surgeon to the St. Joseph's Hospital; Surgeon to the Philadelphia Hospital; late Surgeon U. S. Volunteers.

To the eye of the military surgeon, one of the most startling and interesting phenomena of the battle-field is the retention in death of the last attitude of life; a condition not unfrequently observed in the bodies of those whose death has been violent and instantaneous. That this subject has attracted but little attention is scarcely to be wondered at, when we consider the manifold and pressing duties of the medical officer during and following action; duties which are not completed until long after the burial parties have done their work, and have removed from the field all traces of the dead.

During the recent civil war, I at different times had the opportunity of passing over the field of battle shortly after the close of action, and on several occasions I have been greatly surprised at the extraordinary attitudes presented by the bodies of those who had fallen, with wounds apparently instantaneously fatal, as of the head or heart. In many of these instances the body was rigid throughout, and the position was unquestionably that of the last moment of life. The muscles had, as it were, been surprised by death, and the limbs remained set and fixed in the posture held at the moment of the reception of the fatal wound.

The importance of a proper appreciation of this condition in death, in a medico-legal point of view, is undoubtedly great, and the following ex-

amples of the occurrence of instantaneous rigor following violent sudden death, are accordingly submitted. They have either been observed by the writer, or have been reported to him by eye-witnesses, whose accounts have been carefully examined into, and may therefore be regarded as reliable.

At the battle of Belmont, in Missouri, in November, 1861, I examined the body of a United States soldier of about 40 years of age, who had been shot through the head obliquely from the front to the back. At the moment of death this man was kneeling by the side of a small tree, and was evidently in the act of firing his piece. When examined, the body, not yet cold, was resting upon the right knee and leg, the left leg was bent with the foot upon the ground. The left hand clenched firmly the barrel of the gun, the butt of which rested upon the ground. The head, drooping upon the chest, and to one side, rested against the tree. The attitude of the trunk was generally somewhat forwards. The jaw was fixed, and the rigidity of the body perfect. The clutch of the hand upon the piece was firm. At first glance I supposed the attitude to be one of life, and I could scarcely convince myself, even by close examination, of the existence of death, so life-like was the statue.

At the battle of Antietam, in 1862, I examined the body of a Southern soldier of middle age, who had been killed at the side of the sunken road which skirted the well-known field of corn. This body was in the semi-erect posture, one of the feet rested firmly on the ground; while the knee of the other leg, slightly flexed, pressed against the bank of earth forming the side of the road. One arm extended, was stretched forwards, the hand resting upon the low breast-work of fence rails thrown up to protect the trench. His gun, with ramrod driven half-way down, had dropped from his hand, and lay on the ground beside him. This man had evidently been killed while loading, and in the act of rising from his knees to his feet, probably for the purpose of observation; a ball had passed directly through the centre of his forehead, and had emerged posteriorly.

The fire at this point in the field must have been extremely hot, for in the adjoining cornfield, I counted in an area fifty or sixty yards square, forty dead bodies. Many of these lay in extraordinary attitudes. Some with their arms raised rigidly in the air; some with their legs drawn up and fixed. In not a few the trunk was curved forwards and fixed. These attitudes, in a word, were not those of the relaxation of death; but were rather of a seemingly active character, dependent apparently upon a final muscular action at the last moment of life, in the spasm of which the muscles set and remained rigid, and inflexible.

The death, in the majority of these cases, had resulted from chest-wounds; in fewer instances from shots through the head and abdomen. The latter were accompanied by considerable hemorrhage, as was evident from the pools of dark-coloured blood by the side of the bodies. These examinations were made about thirty-six hours after death, and also later.

Dr. Thomas B. Reed, late Surgeon U. S. Volunteers, has communicated to the writer a singular instance of early rigidity observed by him at the battle of Antietam.

It occurred in the person of a U. S. soldier, apparently 17 or 18 years of age, who had been shot through the heart. The right arm in this body

was raised above the head and rigidly fixed. The hand still held the cap, with which he had been cheering on his comrades at the last moment of life. A peaceful smile was on his face.

The same surgeon, at the battle of Williamsburg, also examined the dead body of a U. S. zouave, who had been shot directly through the forehead, as he was climbing over a low fence. His, too, was the last attitude of life; one leg half over the fence, the body crouching backwards. One hand partially clenched and raised to the level of the forehead, presented the palmar surface forward as if to ward off an approaching evil.

The following instance of fixation of the body was observed by Dr. Henry Stillé, and communicated to the writer by his brother, Mr. Louis S. Stillé. Dr. Stillé, while seated on the top of a freight car on the Nashville and Chattanooga Railroad, saw a brakeman instantaneously killed by a shot between the eyes, fired by a guerilla from the woods through which the train was passing. The murdered man was screwing down the brakes at the moment of the shot. After death the body remained fixed, the arms rigidly extended on the wheel of the brake. The pipe, which he had been smoking, remained still clasped between the teeth. So perfect was the rigidity, and so tight was the grasp of the hands, that the body was with difficulty disengaged from its post-mortem position.

Equally remarkable was the following case, which has been furnished to the writer by Mr. J. N. Burtnett, at the time of the observation a soldier in the United States service.

While a detail of United States soldiers were foraging in the vicinity of Goldsboro, N. C., they suddenly came upon a party of Southern cavalry dismounted. The latter immediately sprang to their saddles; a volley at about two hundred yards range was fired at them, apparently without effect, as they all rode away with the exception of one trooper. He was left standing, with one foot in the stirrup; one hand, the left, grasping the bridle rein and mane of his horse; the right hand clenching the barrel of his carbine near the muzzle; the butt of the carbine resting on the ground. The man's head was turned over his right shoulder, apparently watching the approach of the attacking party. Some of the latter were about to fire a second time, but were restrained by the officer in charge, who directed them to advance and take the Southern soldier alive. In the meantime he was called upon to surrender, without response. Upon a near approach and examination, he was found to be rigid in death, in the singular attitude above described. Great difficulty was experienced in forcing the mane of the horse from his left hand, and the carbine from his right. When the body was laid upon the ground, the limbs still retained the same position and same inflexibility. This man had been struck by two cylindro-conoidal balls, each from a United States Springfield rifle. One entered the body at the right side of the spine, and emerging near the region of the heart, dented the saddle skirt, and dropped upon the ground. The other entered at the right temple, and had no apparent exit. The horse had remained quiet, being fastened by a halter.

These two last cases are exceedingly valuable, and prove beyond all doubt the possibility of the occurrence of instantaneous rigor, following gunshot injuries of the head. In each case the man at one moment was seen to be alive, the shot was seen to be fired, and almost instantly the

presence of universal rigidity of the muscular system was demonstrated, as the accompaniment of the instant death of the individual.

I have also several times passed without examination the corpses of men who had fallen with their muskets in their grasp, pointing forward, and carried as if on the advance or charge. These bodies were usually prone, face to earth, the trunks somewhat bent, and the limbs apparently rigid.

In the report of M. Chenu,[1] a short account, based chiefly on the communications of MM. Armand and Périer, is given of the attitudes of the dead in battle during the Crimean and Italian campaigns. According to M. Armand, who examined the dead of Magenta the day after the battle, a great number retained in part the attitude which they had at the moment in which they were struck, and appeared to have passed instantly from life to death, without agony, and without convulsions. Those shot through the head had generally fallen with their faces to the ground, and for the most part grasped their arms. At the battle of Inkerman, some bodies rested with their knees to the earth, their guns convulsively grasped, and their cartridge in mouth. Some lay with upraised arms, as if to parry a blow. Others appeared to have died in prayer, their rigid hands and interwoven fingers still raised in supplication.

At Magenta lay the body of a foot soldier who had died in hand-to-hand conflict, with arms raised in front, one extended, one bent, and with fists clenched. Here also an Hungarian hussar, killed at the same time as his horse, remained almost in saddle, resting on his right side, the point of his sabre carried forward, as at the charge.

In the observations quoted by M. Chenu, attention is drawn to the facial expression of the dead. Examples are cited, in some of which there seemed to be a "calm and pious resignation," a "smile toward heaven," an "expression of exalted beatitude," and as it were a "murmured prayer," upon the silent countenance. In some there appeared the expression of anguish and despair, in others that of menance and hate. It is quite possible that, at times, such may be the case, where sufficient interval is left for the dying man to think. Certain it is, as many a military surgeon can testify, that the last thought of one, stricken in battle unto death, is of home, wife, children, parents, friends. The writer can well recall instances in which it seemed to him that the dead countenance still bore the impress of the last flitting thought of life.

The same rigidity following instantaneous death, is also witnessed in animals: thus I have seen a dead battery-horse, with a ball through the centre of his forehead, remain for many hours upright on his knees, his head curved in air, semi-erect, rigid, and unsupported. Two other horses,

[1] Rapport au Conseil de Santé des Armées, sur le service médical, etc. etc., par J. G. Chenu, Docteur en Médecine, etc. Paris, 1865.

killed at the same moment, lay on their back and side, the usual attitude of dead animals. A similar instance to the first mentioned has also been reported to me.

From the observations of the French surgeons above alluded to, it would seem that the rigidity of sudden violent death may accompany heart as well as brain wounds. In two cases I have seen this to an imperfect degree, and an account has been furnished me of the death of a soldier of the 4th Wisconsin cavalry, who in 1864 was shot apparently through the heart in a guerilla skirmish in Louisiana. He was instantly lifted by his comrades into a captured buggy, and died as he was placed upon the seat. The vehicle was then dragged along for half an hour, at a rapid pace, by ropes fastened to the saddles of the troopers, when the body was taken out and found to be rigid and bolt-upright in death.

A remarkable example of this rigidity, following most probably wound of the lung and vessels, was witnessed by the writer at Belmont, Missouri. After that action, in riding from the field, he met a young United States infantry soldier, who had been shot some two hours previously through the left breast, rather below the region of the heart. This man had managed to find a stray mule, which he had mounted without saddle, and was endeavouring to reach a place of safety and succor. His symptoms were those of gunshot wound of the lung, as evinced by great dyspnœa, and expectoration of blood. He gradually became weaker and weaker, and shortly died as he rode by the writer's side. His eyes glazed, the jaw immediately fixed, and the signs of death seemed unequivocal. The corpse, however, remained in its upright mounted position, and when, after the lapse of many minutes, and after considerable ground had been passed over, it became necessary to appropriate the mule to the use of a living wounded soldier, the body was found to be so firmly and rigidly set as to demand a certain amount of positive force to free the mule from the clasp of its legs. When placed upon the ground, the rigid sitting posture was retained.

In endeavouring to learn something of this very extraordinary and, in civil life, comparatively rare form of cadaveric rigidity, I find but little on record save the article in M. Chenu's report already alluded to. The same phenomena have occasionally been observed in death from asphyxia, and a number of instances of early rigidity, more or less complete, may be found in Morgagni.[1] According to M. Fodéré, of Strasbourg, subjects who have died of hemorrhages present often an extreme rigidity, retaining the positions which they last occupied in life. An instance is also cited by MM. Marc and Lucas,[2] of an old man who died at a theatre. Here the body remained seated, the forehead supported on the crossed hands, the elbows resting on the ledge of the box.

One of the most famous cases of this kind is reported by M. Marc,[2] and

[1] Epis. Anatom. Med., and De Sed. et Caus. Morb.

[2] Annales d'Hygiène publique, et de Médecine légale, t. vii.

occurred at Dunières in France, in the person of one Courbon, æt. 37, an habitual drunkard. This man was one morning found dead in a trench, in such relation of trunk and limbs that the weight of the body was supported by the head and feet, a position which could only be maintained by the stiffness of the articulations. This rigidity in an unnatural attitude must have been developed at the moment of death, or else, on the theory of murder, the body must have been supported in the posture until cadaveric rigidity had set in, an unlikely supposition.

The post-mortem examination showed that death had occurred from apoplexy brought about by intemperance. Of like nature is the case of Mrs. Reid, cited by Watson,[1] in which the body of the woman, aged 56, was found in a sitting posture in front of her bed, with her head erect, and holding up her right arm and hand. Murder on the part of her husband was suspected, but the evidence was deficient, and despite marks of violence, a verdict of "not proven" was found.

What is the nature of this instantaneous rigidity which occasionally accompanies sudden violent death? This is a most interesting question, and one somewhat difficult to answer. Dr. Carpenter regards the contraction as one "obviously of a tetanic character, which ceases after a few hours; is then succeeded by a state of flexibility, after which the ordinary rigidity supervenes." If a comparison be made between the ordinary rigor mortis, or cadaveric rigidity, and the instantaneous rigor of sudden violent death, or the rigor of the battle-field, if I may use the expression, it will be found that while in some particulars the two approach each other closely, in others they are widely different.

Development.—The ordinary rigor mortis is developed after muscular irritability has ceased, but before putrefaction has set in. The appearance of the rigor of the battle-field is probably synchronous with violent sudden death.

Invasion.—In ordinary rigor mortis, the march is downward; the parts first affected are the neck and jaws; the lower jaw, if previously relaxed, is drawn up; the flexor muscles are supposed to be affected in the greater degree. Battle-field rigor affects probably all regions alike and at once, the extensor equally with the flexor muscles.

Duration.—That of ordinary cadaveric rigidity is usually from twenty-four to thirty-six hours, although exceptionally it may last for days. The duration of the rigor of the battle-field is probably much longer than is usually supposed. I have seen bodies rigid in their last attitude, twenty-four, forty-eight, and in one instance nearly sixty hours after death. M. Armand, at Magenta, saw this rigor twenty-four hours, and M. Perier, at Alma, forty-eight hours after death. The fact of the prolonged continuance of this rigor would seem to militate against the idea of its tetanic nature, and of its being followed in turn by flexibility and by rigor-mortis proper.

[1] Watson: Medico-legal Treatise on Homicide by External Violence. Ed. 1857. pp. 70, 276.

The departure of cadaveric rigidity is in the same order as the invasion. Concerning the departure of the battle-field rigor, I have no data. In exceptional cases, cadaveric rigidity may make its appearance early, and last but a short time. This is a well-known occurrence in animals hunted to death, or which have died from fighting.[1] It also happens in death from the stroke of lightning. A like early appearance and short duration is also observed in men who have died under exhausting conditions, such as wasting disease, or convulsions. But even here an interval of time does exist between the occurrence of death and the appearance of rigidity, and the latter follows its usual march from above downwards.

To the causes of the two forms of rigor-mortis, I will but allude. Those of the ordinary cadaveric rigidity are still under discussion, although supposed to be chiefly due to the setting or solidification of the muscular juices, under the action of an acid developed in them.

I regret not having been able to examine more closely the nature of the fatal lesions, which were present in those cases of instantaneous rigor I have observed. But as is well known, so great are the exigencies of service during and after action, that the medical officer has little or no time to think or act, save as regards the interests and wants of his wounded. He must busy himself with the living, rather than with the dead.

From a careful consideration, however, of all that I have seen and collected on this topic, I am inclined to believe that in all of these cases of battle-field rigidity,

First, The rigidity has been developed at the instant of death.

Second, The cadaveric attitudes exhibited are those of the last moment and act of life.

Third, The death most probably has been instantaneous, and unaccompanied by convulsions or agony.

Fourth, The rigidity is probably more lasting than is usually supposed.

Fifth, It is very doubtful whether this instantaneous rigor of sudden death, or rigor of the battle-field, is succeeded by flexibility in its turn to be followed by the ordinary rigor-mortis.

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ART. XI.—*Pendulous Pedunculated Bronchocele successfully Removed.* By GEO. C. BLACKMAN, M. D., Professor of Surgery in the Medical College of Ohio; Surgeon to the Cincinnati Hospital; and to the Samaritan Hospital, etc.

MR. ERICHSEN, in his most excellent treatise on *The Science and Art of Surgery*, Am. ed. 1869, p. 825, after alluding to the serious character of the operation for the removal of an enlarged thyroid gland, and express-

[1] Gulliver, Ed. Med. and Surg. Journ., Oct. 1848.

ing the opinion that such extirpation should not often be attempted, thus remarks:—

"I have more than once been tempted to remove large pendulous pedunculated bronchoceles, but close examination has satisfied me in all such cases that the neck of the tumour was so vascular, containing large arterial and venous branches, and so intimately connected with the sheath of the carotid, stretching under the sterno-mastoid, which was expanded over it, that no operation could be safely undertaken. In the event of its being thought desirable to operate, the better plan would be, after exposing the tumour, to enucleate it as much as possible with the handle of the scalpel, ligaturing carefully all the vessels divided as they were cut."

We submit the report of an operation which we performed at the Samaritan Hospital during the past winter, believing that the plan adopted is worthy of imitation in similar cases. The details of the case were furnished me by Dr. De Courcey, one of the resident physicians of the Institution.

Frederika Ruckdaschel, German, æt. 36, unmarried, was admitted February 26th, 1869. She was of fair complexion and had always enjoyed good health. There was an enlargement of the thyroid gland on the right side, which had existed for fifteen years. It had never given her much annoyance, and it was only on account of the unsightly deformity that she urgently requested its removal. The tumour was of an oblong shape, about three and a half inches in length, and four inches in circumference, looking much like a banana. In the presence of the class of the Medical College of Ohio, and assisted by Dr. Glover Perrin, U. S. A., and others, I divided the integuments over the most prominent portion of the tumour, so as to completely expose the morbid growth. With the handle of the scalpel and fingers the tumour was completely isolated, with but trifling hemorrhage, until its base was reached. The whole mass was then suddenly wrenched from its connections, and for a few moments the hemorrhage, both from the superior and inferior thyroid arteries, was truly appalling. A sponge was quickly thrust into the wound, but was saturated at once, when it was withdrawn, and pressure with the fingers was made directly upon the bleeding vessels. In the course of a few minutes a sponge was again inserted to the very bottom of the wound, whilst another was applied directly over it, and retained *in situ* by means of a needle, which transfixed the lips of the wound, and the twisted suture. The hemorrhage was now arrested and the patient placed in her bed with the injunction to keep the head and neck as quiet as possible. The sponge nearest the surface was removed on the 2d of March, six days after the operation, but the other was allowed to remain until the 8th of March, the offensive odour having been corrected by a solution of carbolic acid. The wound, which was of great depth, healed with but little suppuration, and the patient left the hospital entirely cured on the 22d of March.

Dr. Perrin, who was the first to inspect the extirpated tumour, called attention at once to the fact that it embraced not only the isthmus of the thyroid, but also the left lobe, which was somewhat atrophied. The disease was simple hypertrophy.

ART. XII.—*Case of Diphtheritic Croup, in which Laryngo-tracheotomy was performed; Death on the Seventh Day, from the Systemic Poison.* By JOHN H. PACKARD, M. D., of Philadelphia.

THERE is perhaps no one of the diseases to which childhood is subject more generally dreaded by parents, or which the physician encounters with less hope, than pseudo-membranous croup. No one is more distressing in its phenomena, or more disheartening in its statistics. Contributions to its clinical history cannot therefore be without interest.

In the case now to be related, the affection began as an ordinary cold, assumed a threatening character on the third day of my attendance, and became hopeless on the fourth, when tracheotomy was performed. Complete relief was afforded by it to the urgent symptoms, but the child, after a respite of somewhat over six days, succumbed to the diphtheritic poison.

R. D. W., æt. 2 years and 5 months, was taken by his parents on a journey in a carriage, during the second week in October, 1869; and the weather being chilly and raw, he contracted a cold, on account of which I was called to see him on the 19th. He was a remarkably robust, well-developed child, and seemed to be labouring under nasal catarrh, with some tonsillitis. His chest was quite clear. The symptoms yielded somewhat to mild expectorants and anodynes, with castor oil, and precaution as to keeping him in a warm and moist atmosphere.

Oct. 20. His voice being somewhat hoarse, and his cough more marked, I ordered ant. et potass. tart. gr. $\frac{1}{3}\frac{1}{2}$, succ. belladonnæ ♏ iv, and syr. ipecac. ʒj, every three hours. Warm baths were also given when he had paroxysms of dyspnœa, or about thrice daily.

21*st.* The breathing was more oppressed, and the voice persistently hoarse, with occasional stridulous cough; and this condition becoming more pronounced, Dr. J. F. Meigs saw him with me in the evening. The left nostril was now lined with a yellow deposit of false membrane, and on the upper edge of the left tonsil there was a firm gray patch.

22*d*, A. M. A somewhat copious epistaxis occurred from the right nostril; otherwise the symptoms were unchanged. Treatment continued until evening, with the addition only of an emetic of alum and syrup of squill, to be given along with the warm bath when the paroxysms came on. At this time his condition was alarming, from extreme dyspnœa. He lay in a drowsy state, with gasping and stridulous respiration, and marked recession of the base of the chest at the end of each respiratory act. His voice was gone; but his pulse was good, and his strength seemed undiminished, although for two days he had taken scarcely any nourishment.

Believing that his only chance lay in the performance of tracheotomy, we asked the counsel and assistance of Dr. Brinton; and after fully discussing the subject, and informing the parents of the difficulties and dangers attending even this course, we decided upon attempting the operation. In arriving at this conclusion, we did not overlook the fact of the diphtheritic character of the exudation, as shown by its appearance in the left nostril; but regarded this as influencing rather the prognosis than the therapeutic

indications. The subsequent history of the case will show the correctness of such a view.

Accordingly, at 10.30 P.M., the child was placed upon a table covered with folded blankets, and chloroform given by Dr. W. Sinkler. (I was unwilling to use ether, on account of its inflammability.) An incision about an inch and a half in length was made in the median line, and the tissues cautiously divided with the edge of the knife until the interval between the sterno-hyoid muscles was reached, when the handle, the finger, and the forceps were used in working down so as to expose the trachea. Twice we met with a smart gush of blood; first at the lower part of the wound, when it was arrested by ligation, and afterwards at the upper part, when a spring-forceps was effectively applied. Finally, having inserted a tenaculum through the anterior wall, I drew the trachea forwards, and with a sharp-pointed knife punctured the crico-thyroid membrane; then, introducing a probe-pointed bistoury, I divided the cricoid cartilage and the two upper rings of the trachea. At the third attempt, I introduced the ordinary double canula, which was at once secured with tapes in the usual way.

The operation, which occupied about an hour and a half, was extremely difficult, the neck being very short and plump, and the trachea lying very deep and excessively mobile. It was immediately followed by great relief to the breathing, and the child soon fell into a calm and natural sleep. He was induced to swallow from time to time, in small quantities, during the night, about six fluidounces of sweetened milk and water.

23*d*, A. M. Patient's condition very good; respiration well performed, and generally not more than 40 in the minute, sometimes falling as low as 28; pulse about 130. But he showed a great aversion to food, and could only be induced to take beef-tea by stratagem; water he took eagerly. Very little trouble was experienced in keeping the tube clear. Lime-water was atomized, warm, through the canula, every hour, and the air of the room was kept thoroughly moist by boiling water. A temperature of 72° Fahr. was steadily maintained. Drs. Horace Williams and J. G. Richardson watched the case most assiduously and skilfully from this time, with Dr. Sinkler, who attended through the night.

The following notes, taken by Dr. Richardson, give an accurate record of the progress of the case:—

"3½ P. M. Patient lying upon the operating-table, apparently free from pain, amusing himself with his handkerchief, nurse's ear-rings, &c. Respiration but little embarrassed, and performed through the canula; it varied from 34 to 48 per minute, according as the tube was coated with inspissated mucus or had been recently cleansed, an operation required about once in two hours. Pulse during sleep 128, force and volume good; skin moist, but rather warm; tongue slightly furred; bowels open; urine, which was passed in bed, apparently normal. Swelling of the neck very slight; no uneasiness from the wound. He refused food, but eagerly swallowed a few spoonfuls of water from time to time.

"During the night he had six evacuations from the bowels, but at 9 A. M., Oct. 24, neither his pulse nor his general appearance showed greater debility. Respiration and heart's action as yesterday. At 11 A. M., in a paroxysm of coughing, he expelled through the tube a piece of false membrane. Bowels moved three times up to 3 o'clock.

"25*th*. Pulse and respiration good; each had apparently decreased on the average, as while sleeping quietly soon after the tube had been cleansed at

1 P.M., they were 112 and 29 respectively. During the day, from 9 until 3, his bowels were moved four times, and two pieces of false membrane were coughed up. The inhalation of the vapour from slaking lime was administered every hour, being found preferable to the steam and hand ball atomizers, both of which had been tried. Atmosphere of the chamber was kept quite moist. During the day he took about one-third of a teacupful of beef-tea, but without relish.

"*26th.* A good deal of swelling about the wound, and several vesications filled with yellow serum; a zone of erythematous redness extending for about an inch beyond the margin of the blistered surface. Pulse and respiration as yesterday; the bowels continue loose; tongue not quite so much furred; and at 11 A.M. he ate half the yelk of an egg with less disgust than he had previously shown for food. Pulse 36, respiration 120. The lime inhalations and the moist atmosphere maintained.

"*27th,* 11 A.M. The inner canula twice removed and cleaned (a dark adhesive mucus being extracted), after which patient fell into a tranquil sleep, which continued for an hour. Pulse 116, soft, regular, of good volume; respiration 28, easy and unembarrassed.

"*28th,* 12 M. After a sleep of half an hour, previous to which the inner tube of the canula had been removed and cleansed, his respirations were 40; pulse 124. As compared with the day before, the radial beat seemed to be a little sharper, more hurried, and to have a slight tendency to irregularity of rhythm. Endeavoured to auscultate the patient, but the transmitted râles from the tracheotomy-tube, coupled with extreme intolerance of the slightest touch, prevented any satisfactory examination. Dark, reddish-brown mucus collecting in the canula, much more abundantly than during previous twenty-four hours; a constant free discharge of reddish saliva and nasal mucus. Erythematous redness not more extended than the day before, and not quite so bright in colour. No air could be detected passing through the nasal or oral apertures."

Evening. Although the patient had no increase of embarrassment in breathing, his condition did not seem so favourable. There was a much darker colour, and more tendency to the exudation of bloody sanies over the skin about the tracheal opening; and his restlessness was greater. This restlessness had been constantly noticed by Dr. Sinkler in a very marked degree at night; the child would clap his hands, roll his head, or swing one leg over the edge of the table, uncontrollably.

29th, 1 A.M. Had a sudden attack of prostration, with failure of pulse, clamminess of surface, and great rapidity of breathing. Under active stimulation he rallied somewhat, but the symptoms returned at about half-past six. Death took place at about 7.30 A.M., six days and seven hours after the operation.

Autopsy, made by Dr. W. Sinkler ten hours after death.—Skin of the front of the neck, and especially around the opening into the trachea, of a deep purplish-red colour; much of the cuticle had peeled off during the last day or two of life, leaving sloughy ulcers. Upper part of neck, and parotid region, especially of the right side, swollen. A subcutaneous abscess was opened into just below the tracheal orifice, containing half a fluidrachm of healthy pus. Mucous membrane of the trachea universally congested and softened; no mark of pressure by the inner end of the tube. Softening and congestion, producing a brownish-red colour, extended up into the larynx, which contained no sign of false membrane; it existed also in a very marked degree throughout the air-tubes of the right lung, which

were full of bloody and frothy mucus. Right pleural cavity contained some serum; lung on this side congested posteriorly and near its apex. At this latter point (near the apex of the right lung) there was a very deep focus of congestion, with actual effusion of a clot of blood. A section sank in water. On microscopic examination, by Dr. Richardson, of a small portion "with a power of 1200 diameters, the air-vesicles were found to be generally filled but not distended with red and white blood-corpuscles in about equal proportions, with a considerable amount of granular matter; the condition was quite distinct from collapse of the lung, and, I have no doubt, constituted an early stage of the red hepatization of pneumonia." Other apoplectic foci, of less size and distinctness, existed at one or two spots in the neighbourhood of this principal one. Left lung entirely healthy, although the mucous membrane of the air-tubes presented the same dusky congestion as those on the right side, but in less degree.

A day or two before the child died, his father became affected with diphtheria, and had copious exudation on both tonsils. The symptoms yielded readily to treatment, and in five days had altogether disappeared, leaving him in his usual health.

So much room has been taken up with the account of this case, that I shall offer only a few brief comments upon it.

1. As to the value of the operation. Difficult and dangerous as this was, it completely relieved the intensely painful dyspnœa, which would undoubtedly have proved fatal in less than twenty-four hours. Both to the child himself and to his parents a great deal of suffering was thus saved; six days of comfort were secured to him, and his death, when it occurred, was comparatively quiet and easy. Hence, even as a merely euthanasial means, the value of the operation can scarcely be overestimated; while the survivors have the sad satisfaction of knowing that no chance was neglected in the case.

2. As to the difficulties of the operation. These, as before mentioned, were very great. Perhaps nothing but actual experience can convey an idea of these difficulties, or of the horrors of death on the operating-table, which might so readily occur in a case of the kind. And yet tracheotomy is often spoken of as one of the "medical operations." Of course in many instances it is far easier than in the one now related; but the statement of Trousseau,[1] that it "is in itself an operation which is more delicate than difficult," is certainly not of universal application, since this is the fourth case of great difficulty which has come under my own observation.

3. As to the cause of death. It is a very common opinion that the existence of false membrane in the trachea or bronchi is a strong contra-indication to operating, and that its absence is in favour of success. Yet, in the case now detailed, there was no such deposit found anywhere in the air-passages after death, although some casts were coughed up within the

[1] Memoirs on Diphtheria, published by the New Sydenham Society in 1859, p. 244.

first three days. The child died from blood-poisoning; all that could be gained by the operation was gained.

On the other hand, in several successful cases of which I have had knowledge, large casts of false membrane have been ejected through the tube.

The abundant literature of the whole subject of croup is so generally accessible, that it is unnecessary to do more than offer this clinical history.

1415 SPRUCE STREET, PHILADELPHIA, Nov. 13, 1869.

ART. XIII.—*Cases of Ovariotomy.* By WASHINGTON L. ATLEE, M. D., of Philadelphia. (Reported by Dr. J. EWING MEARS.)

IN accordance with the plan adopted by Mr. T. Spencer Wells, of London, in the *Medical Times and Gazette*, and by Mr. Thomas Keith, of Edinburgh, in the *Edinburgh Medical Journal*, we propose to report the cases of ovariotomy occurring in the practice of Dr. Washington L. Atlee, commencing with reports of his third centenary of cases. In beginning reports of his cases at this period of his operations, it will be of interest to premise that the mortality in the two hundred preceding cases has been about thirty per cent.; it is impossible to state it more accurately, by reason of the fact that the cases have never been tabulated. This percentage of mortality corresponds very nearly with that of European ovariotomists, and must be regarded, in view of the circumstances which in this country, in many instances, surround the cases, as extremely favourable. The method of operation employed by Dr. Atlee is that designated as the "minor operation," characterized by the small extent of the incision in the abdominal walls, and the reduction in size of the cyst by the evacuation of its contents prior to extraction.

In the treatment of the pedicle he uses the clamp, his experience having led him to believe that it is the best means suggested.

As an anæsthetic agent he administers a combination of chloroform and ether, in the proportion of one part of the former to two parts of the latter, liquid measure. This he finds an effective combination in the production of anæsthesia, safe in its administration, and less liable to provoke nausea and vomiting than either agent uncombined.

In the deligation of bleeding vessels he uses the hempen thread ligature. The incision is closed by iron wire interrupted sutures. In operating he stands upon the right side of the patient.

CASE 201. *Operation April* 14, 1869; *polycystic ovarian tumour, weighing about sixty pounds; extensive adhesions; patient tapped fourteen times, and greatly emaciated and enfeebled; incision seven inches long; recovery.*—Mrs. E. C., aged 59 years, widow, resident of Baltimore,

has been afflicted with the disease, she thinks, over twenty years. Menstruation commenced at the age of 14½ years, and continued to be regular until the age of 43; then becoming irregular, it ceased at 45. She was married at the age of 27; one year after she had one child, and three years after she had a forced miscarriage at five months' gestation.

During the period of time embraced between February 17, 1850, and July 4, 1868, she was tapped fourteen times. The fluid removed by the first tapping was straw-coloured; that by the third was of a transparent opalescent colour, uncoagulable by heat, and contained flakes of lymph. At the twelfth tapping the fluid was of a dirty green colour, and also contained flakes of lymph. At the last tapping the trocar was entered below and then above the umbilicus, no fluid escaping from the puncture below; a bloody fluid was drawn away from the puncture above.

The patient was first seen by Dr. Atlee in consultation with Dr. O'Donnell, of Baltimore, August 11, 1855. All the characteristic features of a monocyst were present, and her health good. This diagnosis was confirmed by second examination, October 25, 1858.

March 17, 1869, the patient was again seen by Dr. A., at which time she was immensely large, greatly emaciated, enfeebled, and very solicitous of relief. The whole right side was occupied by an immense cyst, easily fluctuated, while in a corresponding position in the left side was an equally large solid mass, evidently polycystic—the linea alba being the dividing line. The pelvis was free, and the uterus small and movable. The umbilicus bulged out as large as a small fœtal head, and was translucent with fluid.

April 14, 1869, ovariotomy was performed, Drs. Warren, Scott, Powell, and other physicians being present. The operation was greatly complicated by extensive visceral and parietal adhesions, the separation of which provoked much venous bleeding; these bleeding vessels were secured by separate ligatures, the ends being brought out at the middle of the incision. The whole anterior surface of the tumour was adherent to the abdominal wall; there were also strong bands connecting the tumour with the fundus of the bladder and portions of the intestines. The pedicle was thick, broad, and vascular, and was secured by the clamp, a ligature having been first thrown around it, to reduce its size. The initial incision of three inches was enlarged above and below until it measured seven, in order to remove the tumour, which was polycystic, and involved the right ovary, the left being healthy. Estimated weight of tumour was sixty pounds.

The patient bore the operation well, the pulse being well maintained, and no vomiting occurring. Recovery took place without any unfavourable symptoms.

Remarks.—Several points in this most interesting case are worthy of remark, and from which valuable practical inferences may be drawn. In the early period of its history it was a unilocular cyst, occupied by a non-coagulable fluid, reaccumulating very slowly, making no drain upon the general system, not impairing the functions of life, and not affecting strength and health. I saw her in 1855, and accomplished the third tapping. Instead of stopping there, I ought to have removed the cyst. Or what, perhaps, would have been less hazardous, but quite as successful, I ought at least, in an uncoagulable fluid like this, have drawn out a portion of the cyst, cut it off, and returned the rest. By this means the fluid

secreted by the interior of the cyst escapes into the cavity of the peritoneum as fast as it is secreted, and is there taken up by the absorbents. This is my plan now with those thin peritoneal cysts which spring from the broad ligament, and are filled by an uncoagulable fluid resembling spring water in colour and transparency, and containing only a trace of chloride of sodium. The chances of life, at this early period, were very much in her favour, and the operation would have afforded her fourteen years more of a more comfortable existence.

A similar condition of things continued until the eleventh tapping, with the exception that paracentesis had to be performed at shorter intervals. Following this tapping there was acute inflammation of the ovary itself, and of the peritoneum, and rapid impairment of the vital powers. The whole aspect of things was changed. The twelfth tapping drew off a large quantity of fluid; the first bucketful being a *dirty green, and full of lymph;* the second was *stringy and ropy.* At the thirteenth tapping the fluid was *opaque and of a dirty white colour* in one cyst, while in another that was opened there oozed out a *thick* substance. At this tapping a large lump was first discovered in the groin. The development of more solid matter now became rapid, so that at the last tapping no fluid could be extracted below the umbilicus; and when I saw her in March, 1869, the whole left side was enormously enlarged by a solid mass. This, with the great emaciation and cachectic condition of the patient, caused the most distinguished surgeons of Baltimore to come to the natural conclusion that the patient was beyond surgical relief.

In discussing the question of ovariotomy, the cases ought to be arranged into two classes: 1st, patients who are in a condition favourable for any grave surgical operation; and 2d, those whose powers of life are rapidly failing, and the operation is undertaken with the hope of diminishing impending danger.

To the second class belongs the above case. It was a brand plucked from the fire and saved. Such a result, and the same has occurred in repeated like instances, authorizes the surgeon to lend his aid to these desperate cases; and although they greatly diminish the favourable statistics of ovariotomy, yet, in my opinion, they are the strongest arguments to justify the operation.

CASE 202. *Operation, April 20th,* 1869; *polycystic ovarian tumour; adhesions; never tapped; incision about six inches long; recovery.*—Mrs. R., of North Carolina, married, æt. 29; never conceived; health pretty good; consulted Dr. Atlee, Dec. 21, 1868. She first noticed the tumour in the right side when about the size of a duck's egg. It was quite movable. When recumbent on the back, and the abdomen exposed, no enlargement is perceptible. By palpation a soft, elastic, oblong, cystic tumour can be felt occupying the right side, reaching up as high as the umbilicus, and towards the left as far as the linea alba. It is perfectly movable in all directions, even into the left side. It cannot be elevated to

the same extent, appearing to be retained by a short pedicle. The pelvis is free, the uterus central, the sound enters only 1½ inches. Motion given to the tumour does not affect the sound, except when raised.

Diagnosis.—Tumour of the right ovary. Declined operating on her at this early stage of the disease.

From this time until March 31, 1869, the tumour continued to increase in size, and the patient became very much enfeebled by severe pains in all parts of the person, consequent loss of sleep, and weak appetite.

April 20, 1869. Dr. Atlee visited Raleigh, and found that there had been a rapid increase in size and a great change in the character of the tumour. The patient was now larger than a woman at full term, the tumour multilocular and occupying the whole abdomen, and in consequence of the frequent attacks of inflammation numerous adhesions have been established.

20*th.* Ovariotomy was performed, Drs. E. Burke Haywood, Hill, C. E. Johnson, and other physicians being present. The usual anæsthetic was employed, and an incision three inches in length was made in the linea alba. The large cyst, containing two quarts of yellow transparent adhesive fluid was evacuated, and also several smaller cysts containing a more opaque and darker fluid—some a thick cheesy matter, others a pus-like jelly, and others a white ropy substance. The adhesions were omental and intestinal in character, and were not very strong. The pedicle was membranous, measuring six inches in width. It was condensed by a ligature and secured by the clamp. The incision, enlarged to six inches, was closed by eight wire sutures. There was but little hemorrhage, and no vessels required ligation. The tumour was polycystic, and consisted of the right ovary—the left was healthy. There was no vomiting during the operation, the anæsthetic being well borne. With the exception of slight nausea for two days following the operation, the patient recovered without an untoward symptom—the wound healed by first intention.

Remarks.—The above case was one of very rapid development, and, although death was by no means impending, would most probably have reached a fatal termination in a very few months. It belongs to the first class of cases, but was rapidly running into the second. On visiting Raleigh, and seeing the patient's unfavourable condition, I censured myself for not having operated when she was in Philadelphia, as the chances of life were then infinitely better, and several months of severe suffering would have been saved. My rule has always been not to operate in the early period of ovarian tumour, and where the health has not been impaired, with the hope that the disease, as in some instances, may remain stationary, and that the sensitiveness of the peritoneum may be diminished by pressure and attrition. This, I think, is a judicious course, when the patient is constantly under our own supervision, as thus we are able to act whenever it may become necessary. But in regard to distant patients, I am not satisfied that it is best.

CASE 203. *Double Ovariotomy. Operation May 12th, 1869. Polycystic ovarian tumour; extensive adhesions; never tapped; incision about seven inches; death on the fifth day.*—August 14, 1868, Mrs. J. M'G. consulted Dr. Atlee. She is æt. 36, a native of Ireland, but residing in

this city. First menstruated between 17 and 18 years of age, and has always been regular. When 27 years old she was married and had four children, the youngest being five weeks old. When pregnant the last time she was unusually large, so that twins were expected. She thinks she felt the motions of the child on the left side. However, it is well-known that statements by this class of patients are not reliable. The left leg also swelled, but this swelling left her before the child was born. After the parturition the abdomen continued to be large. She is now as large as a woman at seven months. All the characteristics of a multilocular tumour exists. The tumour is central, elastic, pretty uniform in shape, and non-fluctuating. The uterus is thrown back. The sound was not used.

Jan. 26, 1869. Patient called again. Her condition has greatly changed. The whole right side is bulged out irregularly by a polycystic mass. The left side is occupied by another mass in which one large cyst is embraced. Resonance on percussion only manifest in the epigastrium. and left hypochondrium. Fluctuation discoverable in several of the cysts. Hard points can be discovered in the divisions between the cysts. She now stated that the tumour was first discovered four months before the birth of the child, which was on the 9th of July. No difficulty in parturition. Menstruation returned last week.

May 2. As Mrs. M'G. is anxious for an operation, Dr. A. called at her home to make a more careful examination. She has rapidly increased in size, now being very much larger than a woman at full period. The only resonance on percussion is in the left part of the epigastrium, in an angle formed by an indentation in the tumour, and this resonance exists only when the patient is on her back.

Ovariotomy performed May 12, 1869. Doctors John L. Atlee, Sr., of Lancaster, Pa., Thompson, of Paducah, Ky., F. S. Newcomer, of Indianapolis, Ind., A. M. Owen, of Chester, Pa., Egbert, U. S. N., Drysdale, Keen, Mears, Hoffman, W. F. Atlee, Stewart, attending physician, and other physicians were present. The patient having been anæsthetized, an incision four inches in length was made in the linea alba down to the tumour. An attempt to evacuate the large cyst through the canula of the large trocar failed by reason of the density of the fluid, which was very thick, opaque, ropy, brownish-coloured, and was loaded with large masses of fibrinous-like deposits. The wall of the presenting cyst was incised and the fluid removed. The hand was then introduced into the cavity of the large cyst, the incision in the linea alba having been enlarged to the extent of seven inches, and the smaller cysts were broken up and their contents removed. The anterior surface of the sac was closely adherent to the omentum, which spread over it in a fan-shaped manner, and was very much thickened and vascular; intestinal adhesions existed at various points; on the left side a coil of intestine measuring about six inches in linear length was so firmly attached to the wall of the tumour that this portion of the cyst was dissected out, and allowed to remain in contact with the intestine.

The pedicle was six inches in width, very thick, and embraced the right side of the fundus uteri. Owing to its size it was divided, and secured by two clamps. The left ovary was found to have undergone cystic degeneration, being about the size of an English walnut. It was removed, the pedicle being secured by a ligature, returned to the pelvic cavity, the end of the ligature kept outside. The lacerated portions of the omentum were separated into three fasciculi, and after being retrenched freely surrounded by ligatures, and the stumps secured in the track of the incision

by suture pins; the incision was closed by five wire sutures. Patient bore the operation well, and reacted perfectly. No vomiting during the operation, and but little subsequently. Death occurred on the fifth day. No decided evidences of inflammation or symptoms of pyemia were present. *Post-mortem* examination was not permitted. The estimated weight of the tumour was thirty-five pounds.

CASE 204. *Operation June 7th*, 1869; *polycystic ovarian tumour; no adhesions; tapped once; incision five inches long; recovery.*—June 19, 1868, in consultation with Dr. Keating Dr. Atlee visited Miss D., of this city. She had always enjoyed good health; æt. about 40, and has always been regular. About one year ago, while engaged nursing a relative, she felt as if something suddenly gave way in the right groin, after which she began to enlarge, and has continued to increase regularly in size, particularly during the last two months. She is quite as large as a woman at full period. The enlargement is uniform, roundish, soft, and elastic, free from ridges and nodules, and fluctuates as if the fluid was dense and thick. The pelvis is filled up with an elastic body which has pushed the uterus up out of the pelvis above the symphysis pubis, so that the finger can scarcely reach the os, while the body of the uterus can be detected by the hand outside, occupying an oblique position to the right of the linea alba. The pelvic tumour is evidently a projection of the abdominal. *Diagnosis;* tumour ovarian, and tapping is recommended in order to decide upon the propriety of an operation.

June 27. In company with Drs. William V. Keating and S. Weir Mitchell, Dr. A. tapped the patient of two or three gallons of deep yellow transparent fluid, loaded abundantly with cholesterine, and which by heat proved to be albuminous. The fluid did not escape readily, but towards the last had to be aided by the sound through the canula. After drawing off all the fluid, the abdomen was surveyed by the sound before removing the canula. Behind the cyst tapped the sound detected another cyst-like body, and the abdomen continued to remain prominent. This was partly owing to the adipose walls, but still back of that a mass could be felt, resembling a soft multilocular tumour. The pelvis was still occupied as before, and the uterus elevated, and it could now be more distinctly traced to the right of the linea alba.

A specimen of the fluid was subjected to microscopical examination by Dr. W. W. Keen, and decided to be ovarian. It contained large flakes of the compound granular corpuscles, with masses of cholesterine plates, and also very numerous oil granules and globules. Fatty degeneration was very active.

June 7, 1869. Ovariotomy was performed, the following gentlemen being present: Drs. Keating, Burpee, Drysdale, and Addinell Hewson. No adhesions existed, and the tumour, multilocular in character, was removed through an incision five inches in length. Two cysts were firmly impacted in the pelvic cavity. The pedicle, small and of good length, was secured by the clamp. The tumour consisted of the left ovary, and was composed of four cysts, one large and three small ones. Weight of tumour about thirty pounds. The fluid was amber-coloured. The patient recovered without any prominent symptoms requiring attention.

ART. XIV.—*Two Cases of Growth of the Aspergillus Fungus in the External Auditory Canal.* By D. B. ST. JOHN ROOSA, M. D., Clinical Professor of the Diseases of the Eye and Ear in the University of the City of New York, Surgeon to the Brooklyn and Manhattan Eye and Ear Hospitals. With a Microscopical Description by WILLIAM B. LEWIS, M. D., Lecturer in the University, Microscopist to Charity Hospital.

CASE I. June 30, 1869, I was consulted by J. F. B., a gentleman æt. 24, in regard to pain and impairment of hearing in the left ear. He stated that about a year before he had experienced a sense of fulness in the ear, as if it were "stopped up," and that at the same time there was considerable tinnitus aurium. He consulted a physician who diagnosticated inspissated cerumen, and removed a large quantity of what seemed to be ear-wax from the canal. The relief afforded was of short duration, for the ear was soon filled up. From that time to the present the patient has been in the habit of syringing the ear, and at times masses of some foreign substance were removed by this process. Of late he has noticed black particles strewn in the substance removed, which he thinks are due to the entrance of dust from the smoke-pipe of a steamer during a recent voyage from Europe. The patient now experiences very considerable pain in the ear, and it is the occurrence of this new symptom which has led him to consult me. The other symptoms—the sensation of fulness, tinnitus aurium, and impaired hearing continue. Patient's general health is good, though he is very subject to naso-pharyngeal catarrh.

On examination of the patient, a watch, which is usually heard at least thirty inches from the auricle, is only heard one and a half inches, and the auditory canal is filled with a lardaceous mass, punctated by minute black spots. This mass was very adherent to the walls of the canal, and could not be thoroughly removed by syringing; but required the use of the angular forceps under a good illumination by means of Troltsch's otoscope and ordinary daylight. The surface beneath this mass, which peeled off from the canal, was red and very sensitive. After the removal of the foreign substance, a minute perforation of the membrana tympani was found situated in the anterior and inferior quadrant. There was no true suppuration, but mucus alone bubbled out from the opening during the inflation of the Eustachian tube. The Eustachian tube was shown to be permeable by Politzer's method, but there was very little sensation experienced in the ear when the air was forced in.

On the removal of the collection, the patient experienced immediate relief from the pain and tinnitus aurium, but the hearing was not very much improved. The diagnosis *catarrh of the middle ear* was made, while an exact definition of the state of things in the canal was delayed. Portions of the lardaceous flaky substance removed from the canal were placed in glycerine.

He was ordered injections of warm water by means of Clarke's aural douche (an adaptation to the ear of Weber's nasal douche) several times daily, and to drop in a solution of zinc. sulph. gr. ij ad aqua ℥j twice a day. The Eustachian catheter was used and air injected through it into the cavity of the tympanum.

It was some days before the entire collection was fully removed, and in

spots where it had been separated and taken out it was renewed very rapidly, and each time reproduced the symptoms of pain and fulness. A weak solution of carbolic acid was then used, but it caused very great irritation, and inflammation was set up, which lasted some days. This was treated by the use of warm water through the douche. When it had subsided the lardaceous masses were removed by the forceps, and in some instances casts of the membrana tympani came away, although the walls of the canal showed the most disposition to a reproduction of the growth.

July 27 the opening in the membrana tympani had healed, and the hearing so much improved, that the watch was heard six inches and the symptoms completely relieved. There was still a slight tendency to the growth of the fungus, as it proved to be, on the posterior wall of the canal. The membrana tympani was lustreless and rigid, the handle of the malleus distinct, but there was no light spot. From the 1st of August I did not again see my patient until October 18. Meanwhile he had used the aural douche daily, and the growth had not returned, but the catarrhal inflammation of the middle ear had not been materially benefited, as shown by the rigidity of the membrana tympani and the impairment of hearing. The membrane is now (November 19) somewhat translucent, and the patient is being treated with benefit by means of the injection of air, the use of a gargle, etc., for the middle ear affection.

The flakes preserved in glycerine were examined by my friend Dr. C. E. Hackley and myself under the microscope, and Dr. Hackley believed them to exhibit specimens of *aspergillus nigricans*. At a later date Dr. William B. Lewis very kindly made a thorough examination and confirmed Dr. Hackley's opinion. The results of Dr. Lewis's labours are appended to this paper, and to them must be ascribed most of the value that may be attached to it.

CASE II. Sept. 28, 1869, I was consulted by Mr. S., æt. 51, on account of impaired hearing, vertigo, pain in the ears, and tinnitus aurium. Vertigo was the symptom upon which the patient laid the most stress, and of which he was most anxious to be relieved. He said that he was so dizzy whenever he attempted to walk about, as to be unable to attend to his ordinary business. His condition in other respects was excellent. Patient stated he had heard perfectly well until two months since, when he was attacked with the aural symptoms narrated above, which had been aggravated since their inception. He had been treated by the instillation of oils and so on. He could hear my watch about one inch on the right side, and not at all on the other. Both auditory canals were found filled with a tenacious material, which could only be removed by the forceps. It was several days before I could completely remove the firmly adherent coating of the canal and membrana tympani.

The morbid product was immediately examined by Dr. Lewis, and found to be a specimen of the *aspergillus flavescens*. Its removal gave the patient great relief, but on the reappearance of the growth, which was in two or three days after its thorough removal, the vertigo and tinnitus returned. The membrana tympani was intact, but lustreless and rigid. The Eustachian tubes opened sluggishly, and there was all the evidence of aural catarrh, besides the affection of the canal and of the outer layer of the membrane of the tympanum. The free use of warm water, with an astringent, finally subdued the morbid process in the canal, so that the patient was able to make a journey to the South. When he left my care, Oct. 18, the auditory canals were entirely free from abnormal secretion,

the hearing was improved so that the watch was heard from five to six inches on the right side, and from one to two on the left. The dizziness was entirely gone, and the tinnitus ceased to be annoying. The catarrh of the inside ear, as shown by rigidity of the membrana tympani, sluggish action of the tubes and impairment of hearing, still continued.

Remarks.—The history of the growth of the aspergillus fungus is so recent that I may be allowed to recapitulate it before passing on to some remarks on the foregoing cases. In 1867, Professor H. Schwartze, of Halle,[1] reported a case of inflammation of the canal caused by this fungus as shown by the microscopic examination of Professor Vogel. According to Schwartze, Mayer, in 1844,[2] had reported a similar case, as well as Pacini in 1851, reference to which case is made by Kuchenmeister, in his work on parasites. Schwartze remarks that there must be an appropriate place prepared for the growth of this fungus in the auditory canal, and he supposes that an exudative inflammation, or at least a loosening and softening of the epidermis precedes the growth.

Dr. Robert Wreden, of St. Petersburg,[3] in the following year reported six cases, and he gave the name of *myringomykosis* to the disease caused by the fungus. He subsequently added eight cases to these, and published the whole, with a very complete account of the appearance of the aspergillus, in a monograph.[4]

Dr. J. Orne Green, of Boston, has also published two cases in the *Boston Medical and Surgical Journal*, and he read the history of another at the last meeting of the American Otological Society, which will appear in the transactions of that body for 1869. A very few other cases have been reported in Germany, in the *Monatsschrift für Ohrenheilkunde*, but to Schwartze belongs the credit of having awakened an interest in the study of a fungus, the existence of which had before received a passing notice merely.[5]

There is hardly a doubt but that an affection of the ear caused by the aspergillus has existed for a long time, if not always, but it has not been recognized for the simple reason that diseases of the ear have been until within a few years very much neglected except by isolated practitioners. Since my attention has been turned to the subject, I recall two very obstinate cases of inflammation of the auditory canal, which I believe were subjects of the aspergillus growth. It is interesting to state that they both recovered without any use of parasiticides.

The subjective symptoms of the growth of aspergillus in the auditory canal are very similar to those from impacted wax. There is a sensation

[1] Archiv für Ohrenheilkunde, Band II. p. 9.
[2] Muller's Archiv, 1844, p. 401.
[3] Archiv für Ohrenheilkunde, Bd. III. p. 1.
[4] Die Myringomykosis Aspergillina.
[5] Robin's cases so largely quoted in recent American and English journals, were merely reports of those observed by Wreden.

of fulness, tinnitus aurium, vertigo, pain, and impairment of hearing. As is well known, pain is not one of the common symptoms of inspissated cerumen, although it does occur, but it seems to be of the presence of aspergillus. This may be due to what Schwartze and Wreden are inclined to think is a fact, that is, that an inflammatory action always precedes the growth of the plant, which thus has a field prepared for it.

The objective appearances consist in the adherence of flakes or scales, of what may be mistaken for epidermis, on the walls of the canal and the outer surface of the membrana tympani. Sometimes this whitish adherent material nearly fills the canal. It can scarcely be removed by the use of a syringe, but forceps employed under a good illumination are required to detach them. In the variety known as aspergillus nigricans, little black points are seen in the mass. On removal of the fungus the integument beneath is found reddened and sensitive, and in a very few hours the growth has reproduced itself. The aid of the microscope must of course be called in to make the diagnosis sure.

The etiology of the affection is not quite clear. Wreden agrees with Schwartze in believing that a precedent inflammation has furnished a proper field for the growth of the parasite. In my own cases I think it probable, judging from the history, that the patients suffered from aural inflammation before any growth of aspergillus occurred, but that it was the troublesome symptoms caused by the growth of the fungus which led them to seek medical aid. The aspergillus, according to Wreden, like the pencillium, is found as the mould of damp, or rather unventilated rooms. As we should expect, the habits of the Russians, living as they are almost compelled to in badly ventilated rooms during the long winter, are very favourable to the production of the aspergillus. It is still undecided why the aspergillus should be found in the ear, while the mould which is found with it in the air of a room, the pencillium, does not invade this part. It should be stated that the aspergillus nigricans and flavescens are but varieties of aspergillus glaucus. It is probably the fructification or growth of the fungus which causes the pain and vertigo so often attending the presence of the parasite.

Professor William H. Draper, M.D., of this city, as I learned from him by a verbal communication, saw a case of aspergillus growth on the inner side of the thigh, and the fungus afterwards appeared in the auditory canal. It is reasonable to suppose that other parts of the integument besides that of the lining meatus auditorius may be subject to the invasion of the parasite.

The treatment of the affection is very simple, although it requires some patience and care. The surgeon must attend to it himself, and not leave it to the hands of the patient or his friends. It is impossible for any one who is not able to examine the membrana tympani to be sure that the passage leading to it, as well as the membrane itself, is entirely free from the fungus, even after the most thorough syringing. It need

hardly be said that the thorough removal of any morbid growth or secretion is essential to any treatment of the diseased structure upon which it forms. The aspergillus growth then should be carefully removed, and afterwards the canal be kept clean by the use of warm water, which if persistently used, will soon prevent a reproduction of the plant.

Wreden thinks that the use of a parasiticide is necessary to prevent the growth of the fungus. From my own very limited experience, and from that of Dr. Green, of Boston, who has observed three cases, and Dr. Knapp, of New York, who has observed one, I think no such agent is necessary, but that the thorough and repeated removal with the use of water is sufficient to kill the growth. In the Monograph of Wreden a long list of agents is given, which may be found useful. Some of these are alcohol, bichloride of mercury, acetate of lead, tincture of iodine, and carbolic acid. He gives the preference, however, to the hypochlorate of lime (calcaria hypochlorosa), which he recommends to be used of the strength of one to two grains to the ounce of water. The salt must be freshly dissolved in water at each application. Fowler's solution ranks next to the lime as a parasiticide, according to Wreden.

Botanical and Microscopical Description.—The information with regard to the microscopic structure of the aspergillus available to the general practitioner, in the English language, is exceedingly meagre. Beale[1] gives an illustration of the vegetating portion, the mycelium, of a fungus of this name, and in the few lines of text devoted to the subject mentions that "many filaments contained a receptacle filled with spores." He, therefore, furnishes no means of diagnosis, since it is notoriously the case that the mycelia of different species of these low organisms often have no certain characters by which they may be distinguished one from the other. But, more than this, his language is calculated to mislead the novice in medical mycology. The aspergillus, as we shall see, does not present receptacles "filled with spores," but, on the contrary, receptacles *covered* with spores. The ear is, it seems, at times invaded by a fungus of the character given by Dr. Beale, the ascophora or mucor, otherwise known also as the bread-mould. May it not be possible, therefore, that the growth which Dr. Beale had under observation was an ascophora instead of an aspergillus? Dr. Geo. Harley,[2] in the work edited by G. T. Brown, M. R. C. S., correctly represents the aspergillus, and barely mentions it as existing in the nail and ear without further attempt at description. Other medical writers have quoted these authorities, but there is nowhere to be found a satisfactory account of the appearances and varieties of the plant. We may be pardoned, then, for entering upon a somewhat detailed description of the aspergillus, since Wreden has lately much enlarged

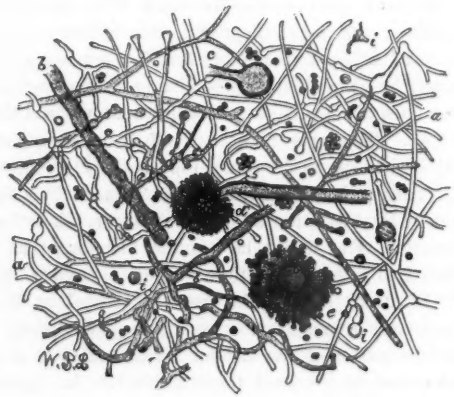
[1] The Microscope in Practical Medicine, 1867, p. 278.
[2] Histological Demonstrations, 1866, p. 254.

our knowledge in this direction. It happens very fortunately that our first cases have furnished the only two varieties of the fungus at present known to invade the ear. They have supplied ample opportunities to compare the minute differences which exist, modifications which, as Wreden suggests, are not sufficiently great to mark them as specifically different from one another or from the aspergillus glaucus, a very common mould. In a higher order of plants they would indeed each constitute a species, but among the polymorphous fungi, since peculiarities of form are dependent upon the soil in which each grows, the *specific* distinctions of phanerogamic botany become trivial, and it is necessary to retain in one species forms which are developed according to a number of dissimilar modes of growth.[1]

The two illustrations of this article were traced upon wood, by means of the camera lucida, from specimens prepared in glycerine. The lens employed is a $\frac{1}{8}$th of Tolles, giving an amplification of 300 diameters. The tracings, however, are upon the scale of 220 diameters, since the drawing surface lay nearer to the eye than the object.

The fungus consists of three essential parts: 1st, the *mycelium*, a dense network, or pseudo-membrane, of delicate fibres which form the groundwork, or roots as it were, from which the 2d part, or *fructifying portion* (fertile hyphen), arises perpendicularly; and 3d, the *free spores*, which lie thickly strewn upon and in the mycelium.

Fig. 1.

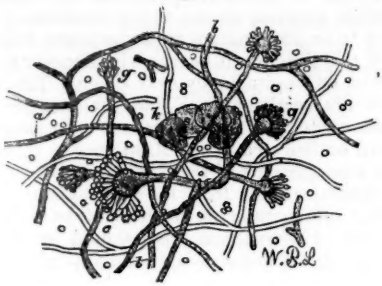


Aspergillus Nigricans. 220 diameters.

a. Mycelium fibre. *b*. Fruit-bearing fibre. *c*. Naked sporangium. *d*. Sporangium covered with basidia only. *e*. More mature sporangium bearing spores upon the basidia. *i*. Spores in a state of germination.

[1] Carpenter on the Microscope, Phil., 1856, p. 335.

Fig. 2.



Aspergillus Flavescens. 220 diameters.

a. Mycelium fibre. *b.* Fruit-bearing fibre. *c.* Sporangium bearing spores upon the basidia. *g.* Basidia showing constriction preparatory to the separation of spores. *k.* Epithelium from the meatus auditorius externus.

The physiological relation of the fruitful fibres to the mycelium is not shown in the accompanying cuts, but may at once be made clear by examining a portion of common mould with a low power.

The fibres of the pseudo membrane are unfruitful, more or less branched, straight or curved, and frequently somewhat swollen at the joints. In the broader fibres transverse cell-walls are distinguished, and all, broad and narrow, contain faintly granular plasma. In the fructifying portions—the expanded heads at least—the cell wall was so much increased in thickness as to be easily measured. The breadth of the mycelium fibres was about the same in both the *aspergillus nigricans* and the *aspergillus flavescens*, from 0.00015 to 0.0002 of an inch (0.0038 to 0.005 of a millimetre). Wreden gives from .0015 to .006 mm.

The fruit-bearing portion, or receptacular filament, is the most interesting, complex, and characteristic part of the fungus. In this and the spores which are formed upon it we find the changes of form which establish the varieties. It consists of a filament, which, especially in the *A. nigricans*, is stouter than those of the mycelium, bearing upon its summit an enlargement, the receptacle or sporangium.

In the *A. nigricans* the filamentous part is tubular, transparent, and brittle, and much larger than the mycelium fibres from which it arises. It is but slightly larger at first, but increases in diameter near its middle portion, where its walls are thrown into waves or sinuosities, and again becomes somewhat smaller as it is inserted into the spherical, or transversely oval sporangium. The walls are here double in outline, being thicker in the waved portion of the filament and in the sporangium where the increase is greatest. Transverse cell walls may occasionally be noticed in the stalked portion, and less frequently a filament may be branched bearing two or more receptacles. The colour of these parts is light-brown, easily distinguished from the yellow or greenish-yellow of the mycelium. The measurements are as follows: Diameter of the fructifying filament remote from the sporangium 0.00045 of an inch (0.0114 mm.); near the sporangium 0.0003 of an inch (0.007 mm.); diameter of sporangium 0.0015 of an inch (0.038 mm.); thickness of wall of the receptacle 0.0001 of an inch (0.0025 mm.), of the wall of the filament 0.000075 of an inch (0.0019 mm.)

The stalk of the fructifying portion of the *A. flavescens* is flexible, and

frequently interrupted by transverse partitions into cells containing the same greenish-yellow granular plasma as the mycelium. Except near the head it is scarcely to be distinguished from the larger fibres of the pseudo-membrane, but in this situation it increases in diameter, gradually expanding into a pyriform or longitudinally oval shape. The larger and more mature sporangia are nearly spherical, but the younger and smaller are oval. The double contour of the cell walls is most marked in the receptacle. The waved outline seen in the *A. nigricans* is wanting in the *A. flavescens*. The measurements of these parts are as follows: Diameter of the fructifying filament remote from the sporangium 0.0002 of an inch (0.005 mm.); near the sporangium 0.00025 of an inch (0.00635 mm.); transverse diameter of sporangium from 0.0007 to 0.0008 of an inch (0.0178 to 0.02 mm.); thickness of wall of receptacle 0.00005 of an inch (0.00127 mm.).

Young sporangia in both varieties are surmounted by a few (five to ten) elongated cells termed basidia. As the receptacles increase in age these basidia become more numerous, and finally, in the *A. nigricans*, envelop the sporangium on all sides, to the insertion of the fibre upon which it is borne. In the *A. flavescens*, however, the lower fourth or third of the sporangium is entirely nude. The basidia are the organs upon and by which the spores are formed. Near the remote end a slight circular constriction at first appears, which afterwards deepens until separation is nearly complete. Each basidium having meantime attained again rather more than its average length, a second constriction becomes apparent, and then a third and a fourth until the number of spores thus attached may reach fifteen or twenty. The first formed spores then become detached and strew the neighbourhood with brown points, the colour, in the ripest, more or less nearly approaching black. In our cases we found no very long chains attached to either variety of sporangium, probably for the reason that in the portions of *A. nigricans* examined the fungus appeared to be advanced somewhat beyond maturity, while in the *A. flavescens* it had hardly fully reached that condition. We could not satisfy ourselves that more than three or four spores were thus attached to a single basidium, in the manner, as Wreden expresses it, of a "string of pearls." The basidia were found to have very nearly the same measurement in both varieties. The length of the spore chains was greater in the *A. nigricans;* we could not feel sure that we found more than two spores upon a single basidium of the *A. flavescens*. The diameter of the heads of *A. nigricans*, including a sporangium, basidia, and spore chains, was nearly twice that of the same parts in the *A. flavescens*.

The spores of *A. nigricans*, as we found them, varied in size from slightly smaller to as much larger than those of the *A. flavescens*, which have a pretty uniform size. When, however, the spores of either variety begin to germinate they increase in diameter, their investing membrane becomes thicker, and a nucleus appears. We found spores in this condition in the *A. nigricans* only.

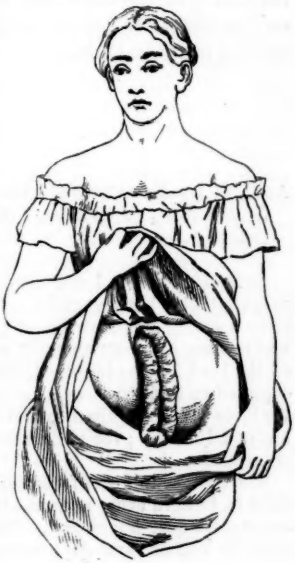
As to colour the spores follow the other parts of these fungi, those of the *A. nigricans* are more or less brown, while those of the other are light yellow, with, perhaps, the faintest tint of green. The former are exceedingly distinct objects when mounted in glycerin, the latter are, in some cases, rather difficult to define when similarly prepared.

The measurements of the parts last described were as follows: Basidia, in both, 0.0003 to 0.0004 of an inch (0.0076 to 0.01 mm.). Basidia and attached spores, *A. nigricans* 0.0009 of an inch (0.023 mm.); *A.*

flavescens, 0.00075 of an inch (0.019 mm.). Spores, *A. nigricans*, 0.000133 to 0.0002 of an inch (0.0034 to 0.005 mm.); *A. flavescens*, 0.00015 of an inch (0.0038 mm.). Germinating spores, in the *A. nigricans* only, 0.00025 of an inch (0.0063 mm.). Diameter of entire fructifying head, including attached spores, *A. nigricans*, 0.0032 of an inch (0.0812 mm.), *A. flavescens* 0.0018 of an inch (0.0456 mm.).

ART. XV.—*Ulceration of the Umbilicus and Strangulation of the Intestine in an Adult Female.* By T. L. OGIER, M. D., Charleston, S. C. (With a wood-cut.)

ON the 20th of December, 1868, my friend Dr. Wm. Fitch called upon me in the night, to see a case with him, requiring an immediate operation. On our way to the patient's residence, Dr. F. gave me the following account of the accident: "About two weeks ago Mrs. S. was attacked with a severe bronchial affection, which ended in pneumonia. She had an umbilical hernia of long standing, which had previously given her no trouble. She now complained of pain in that region, and the skin over the tumour was slightly ulcerated. She was directed to dress this with simple cerate, and to apply a soft compress and bandage so as to support the swelling during the efforts of coughing; but the patient was rather refractory, and neglected these precautions, not appreciating danger from this source, and anxious only about the trouble in her lungs. The cough was to-day almost incessant, and a few hours ago, in one of these violent paroxysms of coughing, the gut was suddenly forced through the umbilicus, and, by the persistence of the coughing, was protruded through the opening until thirteen inches of the intestine hung out in a loop from the umbilicus to the pubis."



On our arrival, we found the loop of intestine above described, devoid of covering (see Figure); it had ceased to be forced any further through the opening, was distended with flatus, and strangulated by pressure against the edges of the ring through which it had been forced. Vomiting, which usually attends strangulated hernia, was now very troublesome, and the matter thrown up was of a greenish-black colour, but not fecal. The loop of protruded intestine was a portion of the ileum, and was of a very dark-red colour, from obstruction of its circulation. To return the swollen gut through the same opening by which it had made its exit was impossible. I therefore passed a hernia-knife with some little difficulty between the intestine and

the ring at the upper and middle portion, and slit up the abdominal parietes about an inch and a half at that point; the gut was then pressed gradually into the abdominal cavity until every portion returned. Much difficulty was experienced in doing this, owing to the incessant coughing. After this was effected, the remains of the umbilical tumour, consisting of the skin, cellular tissue, and peritoneal lining, were pinched up so as to bring the peritoneal surfaces in contact, which were permanently kept so by the application of the quilled suture, made with pen-handles cut about five inches long. A compress of lint, dipped in a weak solution of carbolic acid, was applied over the wound, and a doubled rag, dipped in the same solution, applied over the whole, and confined in place by the ordinary abdominal bandage. Half a grain of morphia was administered, and the patient left to rest, with directions to repeat the anodyne in two hours if not asleep. The next morning the patient was comfortable, and the dressings were not disturbed, except to moisten the outer compress with the same solution of carbolic acid. The case was now turned over to my son, Dr. Wm. G. Ogier, and Dr. Augustus Fitch, to whose unremitting attentions, day and night, the patient owes her recovery. The flap of skin outside of the pieces of wood used for the quill suture sloughed, but the peritoneal surfaces, which had been brought together, united firmly. In three weeks the wound entirely healed, and the umbilical projection disappeared.

A similar case has never come under my observation, nor have I seen one recorded. Umbilical herniæ are generally regarded of little consequence; they are so easily kept in place by a simple compress, that neither patients nor their medical attendants regard them as serious. But from the history of the above case it is evident that this simple malformation may endanger the life of the patient quite as much as a strangulated inguinal or femoral hernia.

ART. XVI.—*Symptoms of True Labour caused by Impacted Fecal Matter in the Large Intestines.* By JOHN J. BLACK, M. D., of New Castle, Delaware.

SEPT. 19th, 1869, I was summoned to a lady 21 years of age, six months pregnant with her first child. I found her in the midst of what appeared to be a strong expulsive labour pain. She had hold of her mother's hands; was bearing down strenuously, and complained of great pain in the small of the back. Was informed that there had been no escape of water, yet I expected to find the head engaged and well down. On examination per vaginam I was surprised to find the parts natural; the mouth of the uterus not at all dilated; the neck rather flaccid; yet about as usual at this period of gestation.

The mother told me, from her daughter's pains, she had expected the child to be born every minute—they having been regular about every fifteen minutes for four hours past. The patient said she had been troubled with them for two or three days before "off and on." I could not suppose the

pains to be otherwise than uterine, yet, under the circumstances, I felt somewhat puzzled, as no progress had been made in labour. Under the use of anodyne suppositories the pains gradually subsided and she obtained some sleep. The next morning I ordered an enema of warm water and salt—having felt some fecal matter in the rectum when making the vaginal examination, and supposing the getting rid of this would take away a source of irritation. The injection produced a moderate fecal evacuation.

For the next three days there was a tendency to recurrence of the pains, and constant nausea and vomiting, which I attributed in part to the anodyne. There was still no dilatation of the os uteri. On the night of September 23d I was again summoned in haste and found the patient, as on my first visit, with apparent uterine expulsive pains every ten minutes; but on examination found everything normal. She was now becoming exhausted from pain and nausea, and I requested Dr. L. P. Bush, of Wilmington, Del., to see the case with me.

When he arrived the patient was suffering pains every ten minutes, and he was as much surprised as I had been to find the os uteri in the condition before mentioned. A mass of fecal matter was again apparent in the rectum, having come down since I had last examined the parts. We determined to quiet the pains as before—give a purgative dose and use an enema of water-flour and croton oil every four hours. The first brought away about as many clay-coloured masses of the size of marbles as the one I had ordered before. The next enema brought little or nothing; but some time afterwards there was a spontaneous movement of the bowels—a part of it an aggregated mass so large as to cause great pain in its exit, and consisting of clay-colored fecal matter in balls varying in size from marbles to walnuts. Several hours afterward there was another similar evacuation, but not so large. The relief was now great—the pains entirely subsided—the nausea and vomiting ceased—the appetite immediately returned, and the case was now solved. This patient had suffered from obstinate constipation soon after becoming *enceinte*, which had yielded to attention and mild remedies. She had been free from it until a few days before the pains came on, and said the bowels had not been opened for six days before this time. I imagine these masses had been there much longer, and perhaps a channel of exit had existed through them. Were these pains uterine or confined to the rectum and colon? I think both. The uterus could be felt through the abdominal walls to be harder during the pains, and she complained of the knot at the lower part of the abdomen.

I do not think the fibres of the neck were affected, yet it is a wonder labour was not brought on. The uterus acted from sympathy and from direct irritation, as we know that during menstruation there is more tendency to looseness of the bowels, and during pregnancy to constipation, thus showing the mutual sympathy.

I had never met with a similar case, and I was at the time perplexed and annoyed, and if this hasty sketch should be the means of relieving professional anxiety or hours of suffering in a patient unfortunate as mine was, this will be my compensation.

NEW CASTLE, DELAWARE, Nov. 3d, 1869.

ART. XVII.—*On certain Peculiarities in the Construction of the Orbit.* By HARRISON ALLEN, M.D., Professor of Comparative Anatomy and Zoology in the University of Pennsylvania.

THE following observations were incidentally made while I was engaged in examining crania for other purposes. They are in one sense, therefore, original. But, as every one knows, the almost exhaustive study devoted to descriptive human osteology, it is doubtful whether anything of importance can be added to the record. Subsequent examination of its literature served to confirm me, in many instances, in this probability, as well as to direct my attention to several features of orbital mechanism that had escaped me. While my facts may be old it does not follow that they are familiar. On the contrary, they are seldom if ever mentioned in text-books. The original memoirs containing their descriptions are found in journals devoted for the most part to purely scientific matter, and which, as a rule, are not accessible to the student. An attempt to bring this scattered material together in something of a connected form, is all that is claimed for this communication.

The bones of the skull may present many peculiarities with respect to their manner of articulation. I have in other places mentioned certain of these which had come under my notice, such as the method of union between temporal and frontal—parietal and sphenoid bones,[1] as well as the great differences which obtain between the shapes of the lower jaw, not only in different persons, but upon opposite sides of the same person.[2]

I now propose to notice the different methods after which the orbit may be fashioned; the floor being omitted as not presenting peculiarities of interest. As may be surmised, standard descriptions will not be widely departed from.

When an author's name appended to a statement is printed in italics, it signifies that I have not met with examples of the kind.

A. *Roof of Orbit.*—Instead of being formed entirely by the orbital plate of the frontal it may possess in addition a thin plate derivable, most probably, from the greater wing of the sphenoid.—(*Czermak,*[3] *Hyrtl.*[4])

[1] Remarks on the Conformation of the Mammalian Skull. Proc. Acad. Nat. Sci., Philad., vol. 18, 1867, 11.

[2] The Jaw of Moulin-Quignon.—Dental Cosmos, vol. ix. 169.

[3] Czermak, Joh. Ueber einen eigenthümlichen Shaltknochen im Augenhöhlendache des Menschen. Siebold u. Kölliker's Zeitschrift, III., 1851, 27. (Taf. 2.) Six cases recorded, all in young people.

[4] Hyrtl, Jos. Ueber wahre und falsche Schaltknochen in der *Pars Orbitaria* des Stirnbeines. Sitzungberichte der K. Akad. der Wissenschaften Wien, XLII., 1860, 213. (Taf. 1, 2, 3.) Gives twenty-five examples of the first. He defines the second (false bones) to be small isolated portions of the orbital plate of greater wing of sphenoid appearing upon the roof of the orbit, at or near the line of its articulation with frontal, entirely surrounded by the orbital plate of the latter.

B. *Outer Wall of the Orbit.*—(*a.*) Usually defined by the union between greater wing of sphenoid, external angular process of frontal and orbital process of malar bone it may show absence of articulation wholly or in part between the anterior portion of greater wing of sphenoid and malar bone. (Hyrtl.)[1] This—a normal appearance in crania of most mammals—appears sufficiently often in the skull of the aged to make it one of the most constant features of senility.

(*b.*) The spheno-maxillary fissure, normally formed by the space included between malar, superior maxillary, and palate bones, and greater wings of sphenoid, may be without the malar, in consequence of the sphenoidal quantity uniting with the superior maxillary. (Gruber.[2]) Holden[3] mentions having seen this peculiarity. He apparently was not acquainted with Gruber's memoir.

C. *Inner Wall of Orbit.*—Usually composed of the sphenoid, os planum of ethmoid, and lachrymal bones,—it may conform to the following variations:—

(*a.*) A descending portion of frontal bone may intervene wholly or in part between sphenoid and ethmoid, or a process from the palatal may ascend to articulate with the frontal process, or may join the frontal directly. (Gruber.)[4] These changes were most conspicuous in two skulls of idiots—one in Prof. Jos. Pancoast's collection, the other in the Wistar and Horner Museum.

Fig. 1.

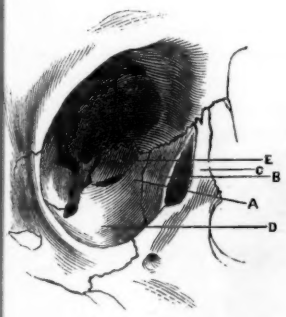


Fig. 2.

A. Process of superior maxilla. B. Lachrymal bone. C. Nasal process of superior maxilla. D. Orbital plate of superior maxilla. E. Os planum.

[1] Hyrtl. Handbuch der Topograph. Anatomie, 1865, 20.

[2] Gruber W. Abhandlungen aus der Menschlichen und Vergleichenden Anatomie, St. Petersburg, 1852, 116.

[3] Holden. Human Osteology. London, 1855, 82.

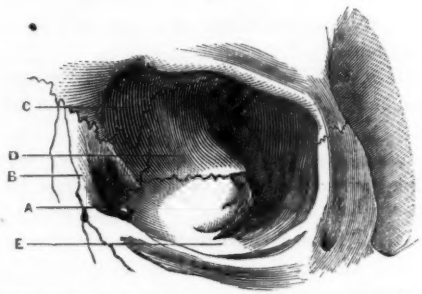
[4] (Ibid.)

(*b.*) A descending process of the frontal may reach the orbital plate of superior maxillary bone, at floor of orbit, or may more rarely meet with ascending process from the last-named bone. (Gruber.)

In Fig. 1[1] it will be seen that the lachrymal bone is completely separated from the ethmoid (which is divided into several irregular areas) by an ascending process from the orbital plate of the superior maxilla. A similar arrangement is seen in Fig. 2.[2]

(*c.*) Lachrymal bone may be reduced to a rudiment, see Fig. 3. Specimen from Wistar and Horner Museum.

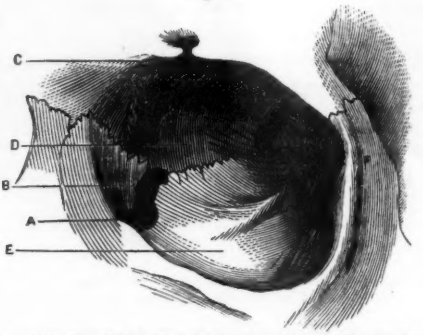
Fig. 3.



A. Rudiments of lachrymal bone. B. Nasal process of superior maxilla. C. Orbital plate of os frontis. D. Os planum. E. Orbital plate of superior maxilla.

(*d.*) Lachrymal bone may be absent; a small irregular space indicating the position it should occupy, see Fig. 4. W. and H. Museum (261).

Fig. 4.



A Osseous interspace indicating the position for lachrymal bone. B. Nasal process of superior maxilla. C. Orbital plate of os frontis. D. Os planum. E. Orbital plate of superior maxilla.

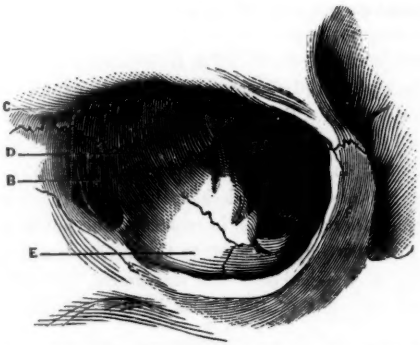
[1] From a skull of a young chimpanzee. Museum Acad. Nat. Sci.

[2] From a skull of Esquimaux, aged 11 years. Morton Cab. Acad. Nat. Sci.

It is quite probable that in this example an isolated rudiment of the lachrymal had existed during life. This absence with indicated space should not be confounded with the absorption of the bone in old age. See Hyrtl, Anatomie. (*Supra.*)

(*e.*) Lachrymal bone may be absent, no interspace (Gruber,[1] Meckel[2]), see Fig. 5. Wistar and Horner Museum (39).

Fig. 5.



B. Nasal process of superior maxilla. C. Orbital plate of os frontis. D. Os planum. E. Orbital plate of superior maxilla.

(*f.*) An accessory lachrymal bone may be found lying between the lachrymal proper and nasal process of superior maxilla. (*Luschka.*[3])

(*g.*) A small ossicle may be seen at the anterior inferior region of inner wall of orbit wedged between the nasal process of superior maxillary, lachrymal, and malar bones. (*Rousseau,*[4] *Gruber.*[5])

[1] Gruber, W., Seltene Beobachtungen aus dem Gebiete der Menschlichen. Anatomie. Müller Archiv. xv. 1848, 412 (Taf. xiv.).

[2] Meckel, Path. Anat. I. 345.

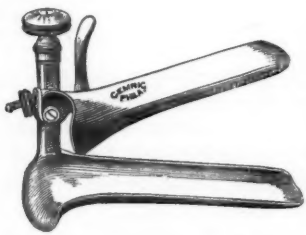
[3] Luschka, H., Das Nebenthränenbein des Menschen. Müller's Archiv. 1858, 304 (Taf. xi.). Twelve cases observed; three figured.

[4] Rousseau, E., Description d'un nouvel os de la face chez l'homme. Annales des Sci. Naturelles, xvii. 1829, 86 (Pl. 5, A. Figs. 1—3). Six cases observed.

[5] Gruber, W., Bulletin Physico-Mathematique de l'Académie des Sciences de Petersbourg, viii. 1850.

ART. XVIII.—*Description of an Improved Speculum.* By J. STOCKTON HOUGH, M. D. (With two wood-cuts.)

THE improvement we have made in the instrument described by us in this Journal for July last, consists in the simplification of the mechanism, and so changing its position as to allow of a free opening on one side throughout the entire length of the blades. This we believe to be an important improvement, as it renders the instrument suitable for the operation for fistula, and does not impair its utility for making vaginal examinations. Another advantage of this modification is the facility of introducing the index finger of the right hand when it is necessary to explore the condition of the parts with the finger. By rotating the instrument a quarter of a circle this opening will look toward the perineum and will allow of the depression of the uterine sound in cases of anteversion and anteflexion of the uterus, which is always, in these cases, a desideratum, and cannot be accomplished with the great majority of metallic instruments, and not at all when a glass one is used. For this improvement in the mechanism I am indebted to Mr. J. H. Gemrig, the maker of the instrument. It will be seen from the figures that the ends of the blades have a peculiar shape, differing



from that of all other specula. This shape is difficult to describe, and can be best understood by reference to the figures. This form I have found of great advantage where it is desired to *pack* the vagina, as there is not the same disposition to pull the material out when the speculum is withdrawn as when the ordinary shaped blade is used. The edges of the blades are turned in, giving them a corded appearance, which allows of the instrument being closed in the vagina without pinching the tissues. The mechanism does not project beyond the end of the blades, and is not at all in the way of the operator, as it is in the majority of instruments designed for these operations. The *short anterior blade* still continues to be one of the particularly desirable and distinguishing features of this instrument in making uterine examinations: as is the *parallel expansion* in making vaginal examinations. The *angular* expansion also remains as before.

PHILADELPHIA, 2003 Walnut Street, Nov. 1869.

TRANSACTIONS OF SOCIETIES.

ART. XIX.—*Summary of the Proceedings of the Pathological Society of Philadelphia.*

1869. *May* 13. Dr. HUTCHINSON exhibited a specimen of *cancer of the liver*, removed from a patient in whom the lung contained a similar deposit.

Melanosis of the Skin and Areolar Tissue.—Dr. S. W. GROSS presented a specimen of tuberiform melanotic cancer, of eleven months' standing, removed from a stone-cutter, seventy-two years of age. The tumour, which was of the size of a walnut, lobulated, and of a sooty colour, occupied the anterior and radial surfaces of the right forearm midway between the wrist and elbow, and was quite movable, but with firm attachments. It was the seat of constant lancinating, stinging pains, which were much aggravated by work, but uninfluenced by atmospheric changes. On its summit there was an abrasion rather than an ulcer, from which there was, now and then, a slight hemorrhage.

In the line of the median cephalic vein there existed two small and hard lymphatic enlargements, which were subcutaneous, and rolled about under the finger. Along the inner edge of the biceps muscle, just above the middle of the arm, there were three secondarily enlarged lymphatic glands, forming quite a conspicuous mass beneath the skin, through which they appeared of a dark colour. In the axilla, also, there was extensive lymphatic involvement. All of these growths made their appearance three months ago.

The patient was losing flesh, his appetite was bad, and the bowels were constipated. On account of the severe pain in the tumour, he was obliged to quit work two weeks ago.

Professor Gross, much against his judgment, but at the man's earnest solicitation, with a view of relieving his sufferings, removed the large mass at the clinic of the Jefferson Medical College. The radial vein and some filaments of the external cutaneous nerve were exposed by the dissection, and one small artery, which alone appeared to nourish the tumour, was ligated.

The growth was found to be intersected by dense fibrous filaments, and was undergoing softening at its centre. Microscopically examined, it was seen to consist of a stroma, with characteristic cells and pigment matter in granules and large masses.

Case of Fibroid Tumour of the Upper Jaw.—Dr. ASHHURST exhibited the specimen, and read the following history:—

R. H., aged 17, a native of this country, and an iron-worker by trade,

was admitted to the Episcopal Hospital on Jan. 20, 1869. It was impossible to obtain any satisfactory account of the previous history of this case, but we learned that he had noticed some obstruction of the right nostril for several months, and latterly the cheek had become swollen below and in front of the malar protuberance. On examination the hard palate was found depressed, and in one part much thinned, so that the presence of fluid above it was easily recognized. There was no enlargement in the region of the canine fossa, no encroachment upon the orbit, and scarcely any on the nostril. It was evident that there was dropsy of the antrum, and the swelling of the cheek—which the patient said was not constant—was supposed to be either due to inflammatory thickening, or possibly a new growth, unconnected with the maxillary affection. A trocar and canula were introduced through the bulging fluctuating surface of the hard palate, and a considerable quantity, probably a fluidounce, of serous fluid deeply tinged with blood, evacuated with immediate relief to the symptoms.

The amendment in the patient's condition was, however, of but short duration, and in the early part of February profuse hemorrhage from the posterior nares occurred on three several occasions. He now mentioned (a fact of which we had before been unaware), that similar hemorrhages had occurred before he sought admission to the hospital. Examination at this time revealed the existence of a solid tumour, the presence of which when smaller had been masked by the fluid accumulation in the antrum. It was now perceived that the entire alveolar border of the jaw was displaced downwards and outwards, and the finger introduced behind the soft palate recognized a tumour projecting backwards into the pharynx. The soft palate itself was manifestly depressed by the superincumbent mass. No connection could be traced between the maxillary tumour and the swelling in the cheek, which I thought I could isolate from the larger mass, getting my finger as I supposed behind and entirely around it.

As the patient was rapidly becoming anæmic from repeated hemorrhages, and as the dyspnœa was constantly increasing, it was evident that operative interference was urgently demanded. Accordingly, on Feb. 18, with the approval and assistance of my colleagues, I removed the greater portion of the right upper maxilla (leaving only the orbital plate, which was perfectly normal), and then proceeded to enucleate the tumour with its several ramifications as rapidly as possible. The external incisions were through the median line of the lip along the ala of the nose, and transversely below the orbital ridge. The vessels of the flaps were tied as they were divided. The bone sections were made with strong cutting pliers, and the jaw as well as the deep-seated portions of the tumour wrenched out with the "lion-jawed" forceps of Sir Wm. Fergusson. The last portion enucleated brought with it a bulbous mushroom-like projection, which proved to be the tumour that had been felt in the cheek. The whole growth was very vascular, and a great deal of blood was lost during the latter stages of the operation. The lips of the wound were approximated, and the patient rallied from the chloroform anæsthesia sufficiently to answer questions, but never fairly reacted, and died about two hours after the operation.

The specimen shows the greater part of the tumour and the portion of jaw removed. The antrum is greatly enlarged. The morbid growth appears to have originated from the posterior wall of the antrum, pressing down the hard palate, and partially displacing the alveolar ridge; it

seems then to have escaped into the middle meatus of the nose, and to have grown rapidly upwards (towards the sphenoid and ethmoid bones), backwards into the pharynx, and finally to have crept outwards through the pterygo-maxillary fissure, making its appearance below the malar bone, in the soft structures of the cheek. The tumour, under the microscope, showed a large number of small vessels, with fibres, cells, and free nuclei. Even in its present state, shrunken from preservation in alcohol, the tumour is the size of a hen's egg, and before removal, when distended with blood was very much larger—much larger, I may add, than any of us supposed before beginning the operation.

I may perhaps be pardoned for alluding to one or two points of clinical, rather than pathological, interest. The unfortunate result in this case was, I think, manifestly due to the combined effects of shock and hemorrhage. The patient was under the influence of chloroform for a considerable time (and very thorough anæsthesia is requisite for operations on the jaw), but it is to be remembered that without anæsthesia, such an operation would be well nigh impossible. The immediate proximity of the tumour to the base of the skull is a very serious complication, and has not unfrequently been the cause of rapid sinking after the operation. This occurred in a case of Liston's. (*Erichsen's Surgery*, p. 863.) Mr. Hewett attempted to remove a fibrous tumour from behind the jaw by what has been called osteo-plastic resection; the patient died before the operation could be terminated. (*Med.-Chir. Trans.*, vol. xxxiv. p. 43.) Quite recently, Sir Wm. Fergusson in an operation for tumour connected with the upper jaw, found the hemorrhage so profuse that, to prevent a similar untoward result, he thought it better to close the wound, purposing to conclude the operation on another occasion. (*Med. Times and Gazette*, Aug. 22, 1868.) Careful and repeated consideration and criticism of the case I have just narrated, have failed to suggest any plan by which the operation might have been rendered more likely to terminate well. Sir Wm. Fergusson's plan would not have answered in this case, for the tumour itself was so vascular that, to leave any portion in position, would have exposed the patient to an almost certainty of continuous bleeding. Ligature of one or both common carotids would of course be out of the question. Possibly, had the operation been done earlier, the patient being less anæmic at the start, and the tumour smaller, a more favourable result might have been attained. The case was one that gave me a great deal of anxiety and care during the whole time it was under my observation, and, I think, should be placed on record, if for nothing else, as an illustration of the difficulties of diagnosis and the risks of treatment in all cases of tumour connected with the upper jaw and the base of the skull.

Fatty and Contracting Kidneys; Gastric Hemorrhage, Chronic Gastritis and Gastric Ulcer, with Hemorrhagic Erosions.—Dr. JAMES TYSON exhibited the specimens, with the following account of the case:—

Being asked to visit the child of the Rev. G. A. D., my attention was called to the father, who lay abed in the same apartment. He said he was suffering from the effects of a violent cold, but considered himself almost well, so that I gave him little attention and no advice. On my next visit to the child, a day intervening, his wife called my attention to a dyspnœa, and "choking" cough, from which the father suffered, more particularly at night. I now examined him closely, and found all the physical signs of a pneumonia in the lower lobe of the left lung. He was placed under ap-

propriate treatment, but convalesced so slowly that it appeared there must be some insidious cause which interfered with recovery. In searching for this, the urine was examined and found to be albuminous, containing however, but a tenth or less of its bulk. No other symptoms called attention to the kidneys, and a hasty microscopical examination revealed no casts at this date.

The patient was forty-seven years old, and for twenty-five years had been engaged most laboriously in the duties of his profession, exposed to all sorts of weather, often remaining for many hours with his feet wet and cold. He had always considered himself vigorous, but his wife has noted a decline in his physical condition in the past two years, during which, and for some years previous, he has been the subject of occasional attacks of so-called "biliousness," but with no other symptoms calling attention to the stomach. On the contrary, his appearance was that of a hale, well-nourished man.

He was placed upon the peracetate of iron in addition to the previous restorative treatment, and convalescence progressed. By the 27th of March he was so far recovered as no longer to require my visits. I advised him of the possible state of his kidneys, enjoined that he should especially obviate fatigue, continue the use of peracetate of iron, and desired that he occasionally send me specimens of his urine.

I heard nothing of him until April 15th, when I was again sent for by his wife. I found he had unduly exerted himself in the nineteen days interval, in attempting to assume his laborious charge, had again taken cold, and was now suffering with bronchitis involving the bronchi of medium size, accompanied by persistent nausea and vomiting, furred tongue and fetid breath, and withal was greatly prostrated, though he referred all his symptoms to the liver. No trace of the late pneumonia remained. Appropriate treatment was ordered, the urine examined, found to contain a little more albumen, *granular* and *hyaline tube casts.* Quantity not measured, but evidently deficient. At my next visit, I found the vomiting continued, and that in consequence, the treatment of the bronchitis must be restricted to counter-irritation. In the vomited matters was included dark, grumous liquid, presenting the characters of altered blood, and found to be such on microscopic examination, by its crystalline constituents; no corpuscles were present. Acute pain in the cardiac end of the stomach, increased by movements of respiration, annoyed the patient much. No signs of a tumour. The treatment consisted of a blister to epigastrium, subnitrate of bismuth and quinia, with beef tea and stimulus as much as could be retained. This was Sunday the 18th. On the 19th, more vomiting of blood. Remedies, however, retained. On the 20th, more vomiting of blood. Dr. DaCosta saw him this P. M., and continued treatment. Also ordered dry cups to entire chest. No further vomiting of blood until 6 A. M. of the 22d, after which none occurred previous to death. The pain gradually abated, and the bronchial symptoms slowly subsided, but there were occasional fatiguing paroxysms of coughing, attended by tough and viscid expectoration. Some abatement occurred in the gastric symptoms, and as stated no more blood was vomited after the 22d. But food could be retained in but small quantity, exhaustion progressed, and the patient died quietly at 6 A. M. of the 27th of May, without coma or convulsion, having requested half an hour earlier that his bladder should be emptied by the catheter.

Post-mortem twenty-eight hours after death.—No external peculiarities.

A thick layer of subcutaneous fat throughout the body. Thoracic viscera entirely normal; recently inflamed left inferior lobe had quite assumed its natural condition.

The *kidneys* were little more than half the usual size, nodulated, and the left contained two small cysts, each four lines in diameter.

Microscopically, the tubules in the convoluted and straight portion exhibited the characters common to the condition described by Beale as the *fatty and contracting kidney*, being in certain places converted into a connective tissue-like structure, in others highly fatty, while in others, again, the epithelium seemed little altered.

The *stomach* was empty. In its cardiac two-thirds it was suffused with redness, and exhibited marked arborescent congestion. The mucous coat was softened throughout, and exhibited distinctly a single true ulcer. Others may have been obscurely present, but the most interesting feature was the existence of a large number of hemorrhagic suffusions, three or four lines in diameter, surmounted in each instance by a point of erosion, the evident source of the hemorrhage before death.

Microscopic examination revealed a granular condition of the capillaries, but the epithelial lining of the gastric follicles was present in its entirety, and seemed little altered.

The renal malady possesses additional interest in its bearing upon the subject of the different *forms* of Bright's disease. It will be remembered that there are usually made four varieties: 1st, the enlarged and acutely congested kidney of acute Bright's disease; 2d, the enlarged fatty kidney; 3d, the chronically contracted and wasting kidney; 4th, the amyloid or albuminoid kidney. To these, Dr. Beale adds a 5th, which he terms the *fatty contracting kidney*. Whether this be or be not a form or stage of the chronically contracted kidney, I think it can be easily made to appear that the case here presented corresponds, as precisely as may be, to the affection thus indicated by Dr. Beale. In his recent edition of *Kidney Diseases and Urinary Deposits*, p. 61, we read: "One of the most serious forms of renal disease is that in which the formation of new texture, the deposition of fatty matter, and shrinking and wasting of the gland tissue are proceeding at the same time. The occurrence of these different changes renders this form of kidney disease most difficult to investigate, and has given rise to much misapprehension respecting it. Tubes of twice or thrice the normal width are often seen close to tubes considerably less than the natural diameter. Of the first, many are choked with fat, some loaded with epithelium, and others filled with glistening material. In some of the wasted tubes, all traces of original structures have entirely disappeared. Not far off from these, perhaps, tubes may be seen in which little departure from the normal characters can be discerned." With regard to symptoms, he also says, "The attack may come on as one of slight acute dropsy. The urine containing a large quantity of albumen, and being of fair sp. gr. 1020, or higher. There is usually little œdema, and for some time the case appears likely to progress favourably. But the albumen does not diminish. In some instances, vomiting or head symptoms come on after two or three months, and the patient soon dies. The symptoms may not have been at all urgent, and up to within a week or two of the patient's death, there may have been nothing in his appearance to lead us to expect the extremely fatal form of disease from which he is suffering.

"Even a careful examination of the urine does not always enable us to discover the nature of the disease. In one of these cases I failed to detect any casts whatever, although the urine was frequently examined; in

another, only a few were found, with a very few fat cells interspersed." Again, "Persons suffering may not be aware that anything is the matter, even up to a few weeks before death. They are often full coloured, well nourished, and are perhaps considered by themselves and their friends to be in thoroughly good health. The patient, perhaps, consults the practitioner on account of *obstinate vomiting*, giddiness, and feeling of heaviness about the head, and dimness of sight. At this time, there may be *little to direct the attention to the kidney;* but if the practitioner examines the urine, he may find a very large quantity of albumen present. I have seen cases in which the nausea and headache were the only symptoms complained of, and have been surprised to find, on examination, evidence of advanced kidney disease"

The history of the foregoing case need but be recalled, to trace the almost complete correspondence throughout, between it and the symptoms and state of the kidney detailed by Dr. Beale. It is this sort of case, according to Beale, which sometimes presents itself for life insurance, and unless the risk is refused on the ground of doubtful habits, the case may not be rejected, and the life drop within a month, the proposer himself having been assured that he was well at date of examination. And I must confess, had my own patient presented himself for such examination three months previous to death, I should most probably have recommended him. And the conclusion of Dr. Beale upon this point is undoubtedly correct, that nothing but an examination of the urine in every instance can save life insurance companies from occasional losses of this kind.

May 13. Dr. THOMSON presented a specimen of *Hypertrophy and Dilatation of the Heart with Insufficiency and Cretaceous Degeneration of Aortic Valves.*—The patient was twenty-nine years old, and exhibited previous to death most of the usual symptoms of the disease.

Malignant Disease of the Stomach; Perforation; Death from Peritonitis.—Dr. THOMSON presented the specimen with the following history.

M. H., a seaman, aged forty, entered the Episcopal Hospital January 20, 1869, suffering from a contusion of the left side caused by a fall into the hold of a vessel. No serious injury had been received, but as the man seemed to be in feeble health, and stated that he had been exposed to malarious influence, he was placed upon a tonic course of treatment, and, as a convalescent, performed duty as assistant nurse in the ward. He took his meals at the full diet table, and gave no indications of the serious lesion which then existed.

Feb. 5. He complained of acute pain in his side, which increased, and was accompanied by vomiting for the first time on the 6th. Acute peritonitis was recognized, which followed a rapid course, and caused his death on the 8th.

The autopsy was made by the resident, Dr. Mustin, who states that the abdominal cavity contained a quantity of yellow fetid fluid. The stomach was adherent to the transverse colon, and in the midst of a large mass of scirrhus a perforation of the walls of the stomach was observed. It is worthy of note that such extensive disease should have caused severe symptoms only a few days previous to death.

Dr. AGNEW recalled a case analogous to this described. An employee in a wall-paper establishment had been a confirmed dyspeptic for many years, complaining of oppression and eructation of food, but was never disqualified for work. On the day before he died, going into the yard, he

experienced a sensation as of something "giving away." He went to bed in extreme pain, followed by tympany and stercoraceous vomiting, and died in forty-eight hours. A post-mortem examination revealed perforation by ulceration from malignant tumour of the stomach.

Report of Drs. Harrison Allen and Edward Rhoads, the Committee to whom was referred the above Pathological Specimen.

The specimen was preserved in alcohol, but the tissues were not shrunk. The growth commenced abruptly about midway along the lesser curvature, involving the outer wall and upper and lower borders up to the immediate proximity of the pylorus. The growth consisted of a series of nodular enlargements blended irregularly together, and forming by their projection on inner aspect of anterior surface a cup-shaped cavity about one and a half by two inches in dimension. The cavity was of irregular depth, and presented a prominent, elevated rim, one-half to three-fourths of an inch in width, except for a space of about an inch where it was flattened, the growth here having extended under the peritoneum outwardly. The bottom of the cavity was ruptured. This opening was about an inch and a half long, had firm nodular walls, and looked downwards and forwards. The pylorus itself was not thickened, but was reached by a hardened nodule at its upper and lower borders. The mucous membrane of cardiac end appeared healthy. Around the edges of the crater-like cavity it was still smooth but seamed and contracted, and at one point there was a pedunculated process extending downwards. This measured one and a half inches in length. The bottom of the cup was roughened, eroded, and ulcerated. Upon dissection it was discovered that the seat of the growth was between the submucous and subperitoneal layers. When the nodules were cut there exuded a considerable quantity of thick fluid which was found upon microscopic examination to contain oil globules, granular matter, and pear-shaped cancer cells. The same elements were associated in large proportion with fibrous stroma in the diseased tissue.

May 27. Necrosis of Tibia; Amputation.—Dr. PACKARD exhibited the amputated leg of John Davis, æt. 39. There appeared no other exciting cause than a blow from a piece of timber on shipboard. The prominent symptom was intense pain, on account of which he implored amputation.

Dr. AGNEW had previously seen the patient, both at the Clinic of the University of Pennsylvania, and at the Pennsylvania Hospital. At the latter he admitted a history of syphilis. He complained of the intense pain, and at the hospital, Dr. Agnew had trephined the bone, thinking there might be abscess, but it proved healthy at that date.

Albuminoid Degeneration of Kidneys; Pericarditis; Embolism of Brain and Spleen.—Dr. HUTCHINSON exhibited the specimens, and read the following history of the case from which they were derived:—

J. J. M., æt. 35, an Irishman, shoemaker, single, a moderate but never an excessive drinker, was admitted into the Penna. Hospital Feb. 11, 1869. Patient's health has always been good until about three years ago, when he was under treatment at the Pennsylvania Hospital, for a slight attack of dropsy, which was accompanied by such an excessive flow of urine as to lead to the suspicion that he might be affected with diabetes. The dropsy yielded, however, to the remedies employed, and he seems to

have been in the enjoyment of at least average health, until the beginning of the present year, when, upon awakening one morning, he found that his left eyelid drooped, and that there was paralysis of the left side of the face, together with some œdema. Epistaxis also soon after took place and has recurred repeatedly, being probably dependent upon ulcerations of the nasal mucous membrane. Soon after he noticed increased frequency of calls to micturition, occasionally as many as twenty during a night. There was, however, no difficulty nor pain in passing his urine, which flowed in a small and feeble stream, but never came away involuntarily. At the time of his admission there was a tendency to the accumulation of food between the teeth and the cheek on the left side, but there was no other evidence of facial paralysis; there was still swelling of the face, but no ascites nor œdema of the lower extremities. His urine was found to be increased in quantity, 96 ounces being the amount passed in twenty-four hours; it was pale in colour, acid in reaction, of low specific gravity, 1010, and contained about one-fifth of its bulk of albumen. Patient's ozæna gave rise to a very offensive sanious discharge. The treatment adopted consisted in the administration of Basham's mixture, and an astringent injection for the nostrils. Microscopic examination of the urine was made by Dr. J. G. Richardson. A few moderately dark granular casts, without cells or blood corpuscles, and crystals of the triple phosphate were found. On March 17, he had an attack of erysipelas of moderate severity which lasted ten days. While convalescing he called my attention to the fact that there was partial paralysis and some hyperæsthesia of the left arm. His heart was at this time carefully examined. The area of percussion dulness was increased, the impulse not very forcible, the sounds indistinct. No murmur was, however, detected. Three days later the paralysis and hyperæsthesia had passed away. On April 24 dropsy reappeared in the face and legs; there was moreover œdema of the lungs, and some ascites. As the œdema of the lungs gave rise to much embarrassment of the respiration, elaterium gr. $\frac{1}{8}$ was ordered. This produced several watery stools, and was followed by great relief. On April 30 I transferred the wards to Dr. J. Aitken Meigs, and the patient passed from under my observation. Dr. Hunter, the resident, however, informs me that three days before the death of the patient, which happened May 15th, choreic movements of the right side of the body, especially of the arm, together with some loss of power on the same side, developed themselves.

The autopsy was made four hours after death.

Head not examined; body œdematous and well covered with fat; Thorax, serous fluid in both pleural cavities; lungs œdematous and compressed by effusion; pericardial cavity distended with about four ounces of fluid; visceral layer of pericardium coated with false membrane of recent formation, adhesions passing between the two surfaces; heart hypertrophied and somewhat dilated (these alterations most marked in the left ventricle); valves competent; some vegetations on the free surface of the aortic valves.

Abdomen: liver enlarged and displaced downwards in consequence of the pleuritic effusion, so that its lower edge reached half way to the umbilicus; spleen enlarged, and contained embolic patches in different parts of its structure; kidneys apparently somewhat enlarged; the surrounding areolar tissue loaded with fat, which was also present in large quantities in the calyces of the kidneys; their surface was finely nodulated; capsule adherent; on section, the arterial substance appeared to be atro-

phied; the surface was studded with white points. The iodine test showed the presence of amyloid degeneration.

It is to be regretted that no examination of the head was made, as it would undoubtedly add very much to the value of the case if we knew positively, what we cannot do otherwise than infer, that the paralysis with which the patient was at various times affected, and the chorea which occurred just previously to his death, were caused by emboli in the smaller branches of the cerebral arteries.

Microscopical Examination by Dr. J. G. Richardson.—The kidneys, which had undergone most marked contraction, showed beneath the microscope a peculiar appearance of the Malpighian corpuscles, whose convolutions were filled with a transparent refractive substance, having a waxy lustre, and becoming of a bright red color when acted on by an aqueous solution of iodine.

The uriniferous tubules were, in many portions of the specimens examined, filled with a similar matter, which assumed an analogous tint, though less intense under the application of iodine.

The smaller arteries around which the Malpighian corpuscles were closely clustered, were decidedly thickened, and exhibited much greater rigidity of their walls than normally exists.

Dr. ALLEN exhibited the leg of a patient, in whom amputation was performed on account of varicose veins, and who died precisely two weeks after the operation from "heart clot."

June 10. *Colloid Cancer, involving Substance of Peritoneum and Lymphatic Glands, more particularly along the Vertebral Column, and, to a less degree, also the Pleura.* Dr. WILLIAM PEPPER presented the specimen and read the following history:—

— ——, æt. about 40, a postman, who had enjoyed general good health, with exception of an attack of malaria and diarrhœa, about 1865, while in army, and a severe attack of jaundice, some years before, from which, however, he entirely recovered without any unpleasant sequelæ, began to notice, in early part of 1868, a swelling in lower part of abdomen. This increased steadily but slowly, without any disturbance of general health.

His account of the beginning of the attack was, that it originated with acute symptoms: violent pain at first in right side, but soon extending over the whole abdomen; vomiting, scanty urine, great sense of prostration. These symptoms subsided after a week or ten days, and left considerable enlargement of the abdomen. As will be gathered from further description of the case, it is probable that they were due to rupture of a small cyst and consequent peritonitis.

There was for some months little or no emaciation or loss of strength; appetite remained good, and he was merely troubled with occasional sense of epigastric distress and tension. No alteration of urine, which was repeatedly examined and always found healthy. Bowels usually costive, requiring use of laxatives.

He had his clothes made so as to accommodate the growing tumour, and continued on his round delivering letters.

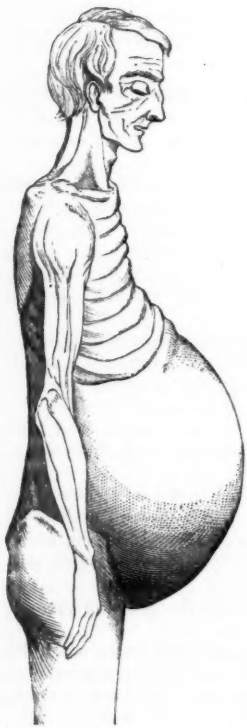
Towards close of 1868, enlargement became so great as to much incommode him—his abdomen being, at that time, as large as a woman at full term. He was then tapped in median line some inches above pubis, and several pints of serous fluid drawn off. The wound healed quickly,

and he returned to his work. In a few months (middle of February, 1869) it became necessary to tap him again. There was then distinct fluctuation in various directions in the abdomen; though it was evident that there was a tumour in addition to the free peritoneal fluid. Paracentesis was again performed by Dr. Levis; the trocar being introduced to the left of the median line and higher up. When first introduced, about f℥ij of pinkish serum with little shreds of lymph were discharged, and the flow then stopped. On withdrawing the trocar, the direction of its point was changed slightly, and a puncture made through a thin walled cyst, which discharged several ounces of transparent, almost colourless, viscid fluid—which became a firm, solid, trembling jelly on exposure.

The first fluid was highly albuminous, contained chloride of sodium and urea, and deposited a very few large round granular nucleated cells.

The colloid material was not examined carefully. The puncture oozed for some time, but healed nicely. The operation did not cause much reduction in his size, but rather merely a subsidence of one portion of abdomen which had been unusually prominent.

In March, his general health was evidently suffering much. He lost flesh and strength; had no hectic nor sweats; no cachectic appearance; no jaundice, no appearance of marked leucocythæmia; appetite rather poor, and unable to gratify it from ensuing distension; respirations superior costal, and he is unable to lie down on back, though he can lie on either side. No cough or sputa; heart healthy; urine continues normal in quantity and quality, passed somewhat too frequently; bowels costive, opened by laxatives.



His appearance at this time was remarkable. Arms and chest quite emaciated, though not extremely so; legs œdematous from venous obstruction; abdomen enormously distended (see sketch), entirely symmetrical; enlargement projected laterally and anteriorly; projection at epigastrium singularly abrupt, and the ensiform cartilage was bent forwards at a right angle. The whole base of the chest was expanded. The liver and heart were pushed upwards.

There was no tenderness over abdomen, excepting at and near epigastrium, and in neighbourhood of point of puncture in second operation.

Palpation did not elicit fluctuation from one side of the abdomen to the other, but in several portions of the abdomen, as in right side and just above umbilicus, there was distinct fluctuation. Strong palpation caused no sense of shock.

There was dulness on percussion over the entire front and lateral aspects of the chest, the only resonance being found in lumbar regions, and most markedly in either when he lay upon the opposite side.

The veins of the abdominal walls were somewhat distended.

The patient urgently insisted upon an operation being performed for his relief; and as, in middle of April, the tumour was enlarging; œdema and discoloration of legs increasing rapidly; cutaneous veins of abdomen enormously distended on lateral aspect of abdomen, and dyspnœa becoming urgent; an exploratory incision was made by Dr. Levis in median line, about half a gallon of peritoneal fluid evacuated, and an enormous tumour (described below) found filling the abdominal cavity, and entirely inseparable from its attachments to all the viscera. The operation was abandoned; the incision closed, and the patient died in three days.

Diagnosis.—The history of a severe attack of jaundice might have turned the attention to the liver, but the entire absence of any permanent disturbance of its function proved that there was no organic disease of its tissue; while the character of the fluid drawn off conclusively showed that it was not a hydatid growth. The absence of leucocythemia or extreme anæmia, the symmetrical character of growth, and the fact that it began in lower part of abdomen, excluded the idea of a splenic cyst.

The absence of any renal symptoms, hæmaturia or albuminuria, rendered it certain that both kidneys were not involved; and the symmetrical character of the growth rendered it improbable that it could depend upon hydronephrosis of one kidney. Yet the manner in which he described the symptoms of the acute attack in beginning of his sickness, made it resemble somewhat an attack of nephritic colic.

The absence of any cancerous cachexia also, such as might be presumed would attend extensive colloid cancer, made it probable that it was a purely cystic disease.

And the existence of urea in the fluid withdrawn by paracentesis, which was believed at that time to come from a cyst, and not to be peritoneal effusion, also tended to direct suspicion to the kidney.

Consequently the diagnosis rested between enormous hydronephrosis principally of one kidney, and cystic disease of the omentum.

Autopsy.—Thorax and abdomen alone examined.

Upon cutting through the abdominal walls, the peritoneal cavity was found to a great extent obliterated by close and strong adhesions between the parietal peritoneum and the tumour below described. Upon forcibly breaking up these adhesions, the parietal peritoneum was found thickened and studded over with numerous nodules. The entire abdominal cavity was filled by a huge mass, which extended far up into concavity of diaphragm, and downwards into pelvic cavity. This morbid growth was quite symmetrical, and upon close examination proved to be composed chiefly of the greater omentum, with some additional outlying masses. The omentum was enormously hypertrophied, being at least five inches in thickness, and reaching from the epigastrium down to the pubes. Its anterior surface was invested by a thick opaque white membrane. Upon cutting into it, its structure was found to be composed of a stroma of dense fibrous tissue, arranged so as to leave cystic cavities of varying sizes, some being barely visible to the naked eye, and others having a diameter of several inches. The fibrous septa separating these cavities were firm, but rarely thick. The inner surface of the large cavities presented a smooth, serous appearance. The contents of all the cavities were of a thick jelly-like character, varying in colour from a light amber to a decided red. The lateral borders of this mass were rounded, but

the lower margin presented innumerable cystic nodules, varying in size from one-twelfth of an inch to one inch in diameter, and containing a similar gelatinous substance. In some places these nodules were partially imbedded in a stroma, but in others they seemed attached to each other merely by delicate fibrous strings. Upon raising this mass, the intestines were found matted together, and imbedded in similar colloid growth. The glands along the vertebræ were enlarged, and a section presented an areolar structure, exuding colloid material. There was an enlarged gland in left groin presenting a similar degeneration.

The abdominal viscera, liver, spleen, and kidneys, presented no positive disease of their structure. There were, however, several very large nodules, 1½ to 3 inches in diameter, of firm colloid growth, attached to under surface of liver; and on left side of abdomen there was a large mass, six inches in diameter, extending from left border of the greater omentum to inner surface of spleen, which was probably the diseased and enlarged lesser omentum.

The peritoneum lining the concavity of the diaphragm was studded over with large and small nodules, which were adherent to and had produced depressions in the concavity of the liver.

Similar nodules were found springing from the pleura investing the diaphragm, especially in the right thorax. The bronchial glands were very much enlarged, and presented colloid degeneration, and there were several small nodules loosely attached to the pulmonary pleuræ. There was, however, no disease of the tissue of the lungs.[1]

It will be observed that, with the exception of the lymphatic glands, the disease was limited to the substance and surface of the serous membranes.

Microscopic examination of the colloid material from one of the cystic cavities in the omentum showed numbers of quite large cells, round, oval, or polygonal, and occasionally aggregated in small plates, like epithelium; with delicately granular contents, and presenting a single clear nucleus. In some instances, the nucleus filled the containing cell almost entirely, so that the cell seemed to have a double contour; in other cases, the nucleus filled the greater part of the cell, leaving a crescent-shaped cavity between the cell-wall and itself. In all these cells, the nuclei themselves were granular, and the surrounding portion of cell was clear.

Examination of a small and unusually firm nodule, whose surface on section showed very few cysts visible to the naked eye, but exuded a glutinous colloid substance, showed a dense stroma of unusually long and closely intertwined fibres, which were pale and flexible, and, in many instances, appeared double-bordered. This stroma included minute cystic cavities, quite closely packed with cells, such as those described above.

A portion of the colloid matter, which was of clear amber colour, presented a sp. gr. 1017.8. Fifteen grammes of it evaporated to dryness yields a residue of .79 gramme. This yielded a blackish-gray ash, weighing .058 gramme, showing the amount of organic matter in 15 grammes to be .732 gramme. Five grammes, treated with fℨijss absolute alcohol, filtered, and filtrate evaporated, yielded of alcoholic extract .033 gramme. Five grammes, treated with fℨijss ether, filtered, and filtrate evaporated, yielded of ethereal extract .001 gramme.

[1] A life-size water colour painting of this specimen was exhibited to the Society.

In answer to an allusion to the diagnostic value of the existence of urea in the fluid withdrawn by paracentesis, Dr. MITCHELL said that the presence of urea was so common under circumstances like these, that he was in doubt as to whether it could be considered of great importance. Thus it is found in the serum of the cavities of the brain, and the aqueous humour of the eye in health.

Dr. PEPPER said that he was aware that it was found in serous effusions, but he thought not in such noticeable quantity as in the present case, unless there has been obstruction to the circulation through the kidney, and interference with its function.

Syphilitic Ulceration of the Larynx.—Dr. S. W. GROSS presented the specimen, and read the following history of the case :—

E. W. S., 39 years of age, a plumber, of temperate habits and married, contracted chancre in 1857, for which he was treated with mercury, and which was followed, without being preceded by bubo, by secondary affections of the skin and throat, and finally, in about eight months, by ulceration of the tonsils and arches of the palate, the latter of which became ultimately firmly adherent to the posterior wall of the pharynx, so as completely to close the posterior nares. The bones of the skull became gradually affected, tender, enlarged, and exquisitely painful, especially at night and in damp states of the atmosphere. With the aid of the iodides, first of potassium, and, for the last twelve months, of sodium, the cranial suffering was kept in check, and the man was able, with occasional short intermission, to pursue his accustomed occupation. He was, however, remarkably susceptible to cold, and his appetite and strength not unfrequently failed him.

During the last three months of his life, he was much confined to his house, the osteocopic pains were very troublesome, and he now experienced great difficulty in his larynx, attended with occasional paroxysms of dyspnœa and of partial aphonia, the latter often continuing for days together. His countenance was wan and sallow, and his spirits were, at times, greatly depressed. A sense of uneasiness was complained of in the region of the stomach, but there was no actual pain or difficulty of deglutition at any period of the illness. The remedies which afforded most relief were iodide of sodium, with bichloride of mercury, and cauterization of the larynx with a solution of nitrate of silver, thirty grains to the ounce of water, every third or fourth day. Morphia and Dover's powder were frequently given at bedtime, and latterly, free use was made of quinia and milk-punch to support the failing strength. For the last week of his life, he suffered much from dyspnœa, and a sense of constriction in the windpipe; his debility greatly increased, but he was still able to be up, and was out two days before his death.

On May 17, he was suddenly seized with an aggravation of his laryngeal troubles, and when I saw him, four hours afterwards, he was tossing wildly about in his bed, panting for breath, exhibiting great difficulty of inspiration, and a peculiar whizzing sound, as if the air were passing through a narrow chink, as in œdema of the glottis. He became rapidly insensible, and expired in an hour after my arrival in a state of asphyxia. I would have opened the trachea, but had no instruments.

Twenty-four hours after death I examined the larynx, latterly the chief seat of the disease. The epiglottis was sound, but the vocal cords were thickened and indurated, and in such close contact as to leave hardly suf-

ficient space between them for the escape of the water that was poured in above. The sinuses were both greatly diminished in size; and on the right side, immediately below the vocal cord, was an ovoid ulcer, nine lines long and six lines wide. It was deeply excavated, with indurated edges, and covered by brownish aplastic lymph, and the mucous membrane in the immediate vicinity was much congested. The cricoid cartilage was materially thickened behind; and the laryngeal mucous membrane, of a pale ash color, was in a similar condition.

Aneurism and Calcareous Degeneration of the Aortic Valves; Spicule resembling Bone in a Branch of the Coronary Artery.

Dr. HUTCHINSON exhibited a heart, which had been removed from the body of a man, æt. 60, who had died after a short illness at the Pennsylvania Hospital. Very little history of the patient could be obtained, but he appears to have been in destitute circumstances, and to have sought and obtained work in a factory in the lower part of the city. While at work he was seen to fall, and was soon afterwards brought to the hospital in an insensible condition. The symptoms upon admission resembled those caused by serous effusion in the brain. The heart was carefully examined by auscultation and found to be beating feebly, but no murmurs were detected. Death took place about six hours after admission.

The autopsy showed that the aortic valve had undergone calcareous degeneration, and there was evidently constriction and insufficiency. In one of its segments was found a cavity containing coagulated blood. One of the principal branches of the coronary artery felt under the fingers as if its coats were converted into bone, but a closer examination showed that the calcareous matter was contained within the vessel itself.

The brain was somewhat softened and œdematous, and there was an effusion of serum into the ventricles and subarachnoid space. Embolism of the cerebral arteries was suspected, but no emboli could be found.

Dr. Hutchinson also called attention to the absence of murmurs during the last few hours of the man's life, notwithstanding the great constriction and insufficiency of the aortic semilunar valves, and attributed it to the feeble contraction of the heart.

Dr. STILLE said there was a fact of clinical interest and importance in this case, to wit, that, considering the form and degree of the lesion involving the valves, there should have been so feeble a murmur as the report of the case mentions. This case recalled a similar one which recently occurred under his own observation at St. Joseph's Hospital. A woman was admitted with acute articular rheumatism, and on examining her heart, a loud, rough, regurgitant, mitral murmur was heard. She had also a very frequent pulse and hot skin, and the heart was acting with very considerable force. Under an alkaline treatment during the day and opiates at night her condition improved somewhat more rapidly than was anticipated, and she became convalescent. When the fever fell, and the pulse had been reduced nearly to its normal standard, the murmur almost entirely disappeared, so much so that even when the patient was placed in the sitting position, it could scarcely be heard. She continued to improve. With returning appetite her strength increased, and the murmur returned, showing that our power of detecting a murmur at a given moment may depend upon the force with which the heart is acting. At one time, while it was contracting under the stimulus of fever, there was a rough murmur, which Dr. Stillé attributed to an old lesion. After convalescence was es-

tablished, and while the patient was still weak, it disappeared, because the force of the heart was insufficient to develop the murmur, but as her strength returned the murmur revived, and thus the judgment was confirmed, which was already based upon the quality of the murmur, that the valve was the seat of an old lesion.

Fœtal Monstrosity.—Dr. R. W. HARGADINE exhibited the specimen for Dr. Hillyer, and furnished the following account:—

The fœtus reached the end of the eighth month of gestation, and is about the usual size. The mother had an easy labour, the child being born before the arrival of Dr. Hellyer. It breathed about a half hour. The peculiar external appearances are these: The brain, attached by a pedicle to the posterior portion of the skull, hangs down the back as low as the middle of the dorsal region, covered by its thin membranes, through which the convolutions could be easily seen when the specimen was fresh. The skull is flattened, and there is *apparently* no cranial cavity. The eyes are very prominent owing to flattening of the orbits. The mouth is large and open, and the neck short and thick, giving to the fœtus that peculiar brute-like appearance so characteristic of monsters of this class. The body and limbs are well developed with the exception of the feet, one of which is clubbed. On removing the vault of the cranium, at least one-fourth of the brain-substance was found within its contracted cavity, in the shape of two long flattened lobes, one on each side of the median line. These were distinctly convoluted, and were connected with the extra-cranial lobes by a constricted band of brain-substance. Nearly the whole of the superior portion of the occipital bone together with the posterior arches of all the cervical vertebræ were wanting. The spinal cord began to curve backward about the last cervical vertebræ, and the medulla oblongata, pons Varolii, cerebellum, together with what appeared to be the two posterior lobes of the cerebrum, were entirely outside of the cranial cavity, and formed this pendulous tumour. The brain-substance being soft, and easily torn, the course of the principal nerves and the relations of the ganglia of special sense could not be traced, with the exception, however, of the optic and olfactory nerves, which, arising apparently from the intra-cranial lobes, took their usual course.

In regard to the vascular distribution, some abnormalities were noticed. The anterior cerebral arteries ran the whole length of the intra-cranial lobes, and came off directly from the basilar. The carotid divided into a number of branches which anastomosed with these, but no circle of Willis existed. Nothing abnormal was observed within the thoracic or abdominal cavities except the absence of suprarenal capsules, the most careful search for which failed to detect them.

The foramen ovale between the auricles of the heart was found nearly closed by an exceedingly thin crescentic-shaped membrane.

I would mention that absence of the suprarenal capsules has been observed by Vrolik and others, occasionally, in exencephalous and anencephalous fœtus. No microscopic examination of any portion was made.

June 24. *Intestinal Obstruction; Recovery; Subsequent Death from another Cause.*

Dr. STILLE exhibited the specimen, which consisted of a portion of gut which had evidently been the seat of intussusception. The lower portion

of the bowel was entirely healthy, but at the point of intussusception there was a depressed rim, surrounded by a certain amount of indurated lymph mixed with fat.

Horny Tumour of the Lower Lip.—Dr. S. W. GROSS presented a specimen of conical horny tumour, five-eighths of an inch long and one inch in circumference at its base, removed from the left lower prolabium, where it had existed for three years. The subject of the growth, John F., aged seventy-one years, eighteen months previously noticed a small, round ulcer at its site, which he ascribed to smoking a short, clay pipe, which he always held on that side. During this period, the ulcer, which was the occasional seat of sharp and shooting pain, remained stationary, and he did nothing for it. It then scabbed over, and the horny tumour formed so rapidly that, in three months, it was an inch and a half long, and resembled a cock's spur reversed. About once every four weeks he clipped the mass with scissors, having previously softened it by means of a bread-poultice, and even then he found it hard to cut. For the past three weeks, the lip at the root of the growth has been the seat of lancinating pain, which sent him to the clinic of the Jefferson Medical College on the 16th of June, when Professor Gross removed it. The horn itself was quite insensible.

Sept. 9. Traumatic Neuroma of Brachial Plexus following Amputation of Humerus.—Dr. WILLIAM PEPPER, in exhibiting the specimen, gave the following account of this case:—

The patient was a man aged forty years, who had served in the army during the late war. The amputation had been performed for a compound comminuted gunshot fracture of right humerus, which required the removal of the bone at its surgical neck. The amputation was a primary field operation, and was followed by rapid recovery with an excellent stump. Several years afterwards, symptoms of spinal disease made their appearance, and he died paraplegic in September, 1869.

On post-mortem examination of the parts, there was complete bony anchylosis between the head of the humerus and the glenoid cavity of the scapula. The humerus at the point of amputation was rounded off to a conical shape, and the end of the bone covered in by a thin layer of compact osseous tissue. All of the nerves of the brachial plexus, save the musculo-cutaneous, terminated in a neuroma, about three-quarters of an inch in diameter, which was adherent to under surface of humerus. There was a separate neuroma of small size upon the extremity of the musculo-cutaneous nerve. The brachial artery was obliterated for a short distance above point of amputation, and terminated in a fibrous cord, which was also inserted into the large neuromatous tumour. No examination of the spinal cord has been as yet made.

Dr. KEEN referred to the recent observations of Dr. W. H. Dickinson and Vulpian (*Amer. Journ. of Med. Sci.*, Jan. 1869) on this subject, and asked Dr. Pepper as to the cause of the anchylosis of the humerus. Dr. Pepper stated that the patient did not come under his observation until some time after the amputation; that during this time he was quite confident no inflammatory condition of the joint was present, and that probably the anchylosis resulted from want of use. There was also a certain amount of anchylosis in both knee-joints and one hip-joint.

REVIEWS.

ART. XX.—*Die Tuberculose, die Lungenschwindsucht und Scrofulose. Nach historischen und experimentellen studien bearbeitet.* Von Dr. L. WALDENBURG, Privat docent an der Kœingl. Universitæt zu Berlin. Berlin, 1869, pp. 560.

Tuberculosis, Pulmonary Consumption, and Scrofula; historically and experimentally studied. By Dr. L. WALDENBURG, private teacher at the Royal University of Berlin.

"The progress of science resembles the course of a spiral. It advances continually by departing from the centre and returns in circle-movement ever again towards it. The short-sighted either observe only the advance and overlook the return, or, on the contrary, recognize only the circular motion and the advance escapes them. Science, however, presses eternally forwards, but is ever bound, in the mean time, by the limiting radius of human knowledge."

DURING a period of progress more marked than any probably in the history of medicine, and at a time when the fundamental branches which underlie the therapeutic art are especially the subject of close reinvestigation, it was not to be expected that tubercle could escape attention. The diseases resulting from it, or attended by it, are too widespread in their prevalence, too frequent in their occurrence, and too fatal in their course to allow of the subject occupying a secondary position among those claiming the attention of the profession. There is, besides, the deep mystery which yet surrounds the origin of this pathological product, to add to the interest attending its study, because this origin is reasonably connected with the power to cure, or more certainly, with the power to prevent. It is a mystery yet hidden among the minute ramifications of artery, vein, and bronchiole, the changes of plasma and cells which attend the primary processes of nutrition, and not until we have solved it may we expect to control those diseases which now too often baffle our most persevering efforts.

The immediate cause of a renewed and eager study of the subject of tubercle within a few years past was the discovery of a remarkable fact in regard to it. We allude, of course, to the discovery of its inoculability by Villemin. He read his memoir before the Academy of Medicine, of Paris, in December, 1865, and the conclusions to which he arrived were such as to awaken the most profound attention. That tuberculosis is a specific affection—that it has its origin in an inoculable virus—that it belongs to the zymotic diseases and is allied to scarlatina, smallpox, and syphilis, and more nearly still to glanders—these are propositions which, if true, revolutionize all received doctrines, and compel the profession to study it anew. No wonder that Villemin's statements were received with "general distrust;" no wonder that the study was immediately commenced, his experiments repeated in every quarter and the results watched with the most eager interest.

To the impetus thus given to the study of the pathology of tubercle we owe the book whose title and motto are placed at the head of this article. The author's name has been heretofore, so far as we can learn, and certainly on this side the Atlantic, unknown to fame. It appears that he is editor of the Berlin *Klinische Wochenschrift*, and from a casual reference we find that he has previously published one work upon the subject of respiratory therapeutics,[1] which we now regret we have never seen.

However unknown the author's name may have been heretofore, we are much mistaken if it be not familiar in the future. In the composition of this work he has certainly shown most excellent scholarship and the greatest industry; it exhibits alike the close study and conscientious judgment of the historian, the patient exactness of the experimental physiologist and the careful reasoning of the philosophic physician. We are aware that this is saying a great deal, yet it is justly deserved; nor are we alone in our opinion as to the merits of the book, for very high authority has termed it "one of the most valuable and important medical works which has appeared for many years." In the historical portion the author presents the views of every writer upon the subject, from the time of Hippocrates down to the date of publication; he has gone to the original sources for his information and gives exact references to every author quoted. The mass of material at hand for this portion of the work must have been immense and the labour commensurate. The experimental portion exhibits the most scrupulous effort to exclude every source of error and to attain the truth regardless of any effect it might have upon past or present doctrine. Finally he states the conclusions to which his study of the subject has led him; that they are the honest convictions of an earnest student is apparent; that they are complete he does not claim; that they can be final in this transitive period of knowledge in which we live is scarcely possible. Nevertheless, he advances so many arguments in support of them, from experimental physiology, from pathology, from clinical observation, and from reason as to compel our attention. Possibly the near future may dispose of his theories as the past has disposed of so many others, and by enlarging the field of our vision reveal to us what he does not see, yet we cannot now afford to neglect his labours. The facts he presents will always be good, and the theories cannot but serve to help us forwards. If it shall be proved that all his doctrines are fallacious, and leaving his experimental researches out of view, still the skill with which he has traced a most complicated web of doctrine, the assistance he has rendered towards the attainment of a consistent nomenclature, and the clearness with which he has separated the known from the unknown would make his work a most valuable contribution to our science and demand from us a careful examination.

As before said, the verification or refutation of Villemin's doctrines was the author's starting point, and he confesses that he entered upon his task sharing the general distrust. This scepticism as to the inoculability of tubercle was speedily removed, however, by experiment, but he found himself forced to a very different interpretation and application of the facts. This led him to a study of authorities upon the subject, and he was immediately struck with the wide disagreement existing among them; views

[1] Die Inhalationen der gerstäubten Flüssigkeiten sowie die Dämpfe und Gase in ihrer Wirkung auf die Krankheiten der Athmungsorgane. Preischift. Berlin, 1864.

opposite, and even directly antagonistic, were held by writers, while from a different application of the same terms there had arisen the most bewildering confusion :—

"There reigned here a confusion such as is seen in few other branches of medicine. Besides the confounding of tuberculosis with pulmonary consumption, one author denotes by 'tubercle' a very different thing from another; what one calls tubercle is to the other nothing but the product of cheesy metamorphosis; what by this one again is called tubercle is by the other termed 'granulation;' a third calls both tubercle; finally for one of the parties the original term tuberculosis disappears entirely to be replaced by granular metamorphosis. A final union of the parties is now a pressing necessity if science is not to suffer serious injury from what is for the most part a verbal conflict."

A glance at the accepted text-books in our language will show how true this is, and show too that the confusion has been made more bewildering by the attempt of those holding different views to designate one among the different substances known as tubercle as the "true," or "real" tubercle; evidence enough that there has arisen a pressing necessity for a distinction being made. Nor do we find any greater harmony as to the nature of scrofula and its relations to tubercular disease. It is at once the cause of tubercle and the effect of the tubercular constitution; by some it is held to be something entirely different from tubercular disease, closely related to it by others, and by many they are looked upon as identical, and the terms are used synonymously.

To trace out the origin and growth of this confusion the author entered upon the historical study of the subject, believing this, too, to be the best means of removing so great a hindrance to further progress of the subject. How thorough and complete that study has been, we have already stated. But through this portion of the work it is of course impossible for us to follow him, although there is no lack of matter either interesting or instructive.[1] Still, enough must be gleaned from the historical portion to furnish us a clue for guidance through the labyrinth of conflicting doctrine, nor do we think we shall be performing needless labour for many of the profession in this country, if we present the views of the late German school upon this most important subject. Fortunately we do not have to go very far back into the past; "in ancient times and in the middle ages miliary tubercle was entirely unknown," that important kind of tubercle—that which to most of the German writers and to our author *is alone tubercle*, is a discovery of very recent times. In the whole history of this subject it is astonishing how few doctrines need to be examined except those of teachers from whom the present generation of medical men learned pathology, and this gives to this portion of the subject the strong attraction of warm personal interest.

It was only with the rise of anatomy in the sixteenth and seventeenth centuries that progress in knowledge of tubercle became possible, and then it was made but slowly, and, as in other branches of learning, with long intervals of cessation and frequent periods of retrogression. Only slowly was the Hippocratic doctrine of ulceration and suppuration of the lungs abandoned; and an anatomical connection shown between vomicæ, and those pulmonary deposits which were generally termed "tubercles" in the

[1] One fact too interesting to be omitted, is, that Addison taught a direct origin of the pus corpuscle from the colourless blood corpuscles, so lately experimentally established by Cohnheim. The reference is to Trans. of the Provincial Med. and Surgical Association, vol. xi. p. 247.

sense of "nodule," without reference to any special composition or structure, and sometimes "scirrhus" from their hardness; and only slowly was the fact established, that these are not diseased glands, imperceptible in health, but a pathological product *sui generis*.

Modern progress may be said to have begun with Stark and Reid; the former had been dead fifteen years, when the results of his labours were published by the latter in his work entitled "An Essay on the Nature and Cure of the Phthisis Pulmonalis," [London, 1785]. The service of Stark was the description and establishment in pathological anatomy of miliary tubercles, until then only incidentally mentioned and considered as of but seldom occurrence. They had been discovered by Manget, and a description published in 1700, but his labours had been entirely overlooked for nearly a century. To Reid is awarded the credit of having entirely separated scrofula from tubercle, and of settling the question as to tubercles being diseased glands.

Baillie was the next to make essential progress in our knowledge of tubercle. He taught the formation of the larger pulmonary nodules from a confluence of miliary tubercles. He did more—

"He separated already—and this is also an important advance beyond his predecessors—the nodules formed by a conglomeration of miliary tubercles from other deposits, which were later described as infiltrated tubercles, but which, until now, had been included in the term tubercle."

The substance of these deposits—the later so-called cheesy matter—Baillie declared to be "scrofulous matter," and considered it identical with the material of tubercle.

"With this acceptance of the idea of scrofulous matter, a new and essential point was gained for pathological anatomy—*the distinction of tumours and deposits according to the constitution of their substance.*"

Baillie rendered another important service in describing the tuberculosis of other organs besides the lungs, as the liver, spleen, kidneys, and cerebral meninges.

Portal, who published his work during the French Revolution, did not add much to Baillie's facts, but made a great and important change in his *names*:—

"The steatomatous matter (our caseous), which Baillie calls scrofulous, received from Portal the name 'tuberculous.' With this designation, which, unfortunately, rapidly established itself, was laid the foundation for all the future confusion which reigned in the doctrine of tubercle, and which prevails in our day."

While "tubercle" originally meant a nodule, or a projection simply, without reference to composition, the term had gradually been limited to those nodules in the lungs having a certain resemblance to glands, and was afterwards applied to those nodules in other organs resembling the pulmonary. These nodules or tubercles were sometimes firm and hard, sometimes soft, steatomatous, and cheesy.

"While now there was all at once *one* condition of the development of these tubercles chosen out, that namely of a steatomatous or cheesy consistence, and designated as tuberculous, there was committed a *logical fault*, which was doomed to severe punishment. Logically this step should either not have been taken, or if taken then the term tubercle for the nodules should have been given up, and another name substituted for it. For thus was brought about the unfortunate condition that there were, on the one hand, tuberculous affections

that had not the slightest connection with tubercles, and, on the other hand, tubercles in a certain stage of their development, that is so long as they were firm and hard, that, strictly speaking, were not tuberculous. It would certainly have been better to have retained Baillie's designation of 'scrofulous matter,' although by it a connection with scrofula was assumed which had not been proved."

Bayle, the immediate predecessor of Laennec, whose "epoch-making" work appeared in 1810, is the next great labourer in the field. He first applied the name "miliary" to tubercles, first discovered them in the larynx and trachea, and, far more important, first pointed out that clinical and genetic connection between the affection of these different organs which all before him, even Baillie, had failed to see. Consumption was no longer a local disease confined to the lungs, but a general disease affecting the whole body—a chronic disease of special nature, and not depending upon inflammation of glands or lymphatics.

"In the clear demonstration of these facts lies Bayle's most important service, which will make his name immortal in the annals of science."

Bayle created then the tuberculous diathesis. He committed, according to our author, the error of Baillie and Portal: the softening and caseous change of the deposited matter he looked upon as pathognomonic of the tuberculous degeneration, whether the matter was in the form of nodules or infiltrated—the kind of matter was of more importance than the form; "tubercle loses its meaning of a nodule entirely, and in its place appears the 'tuberculous matter.'"

"What was gained thereby? In the place of scrofulous matter, was tuberculous, instead of scrofulous degeneration, we have tuberculous, with the open acknowledgment that the idea remains the same and only the names are changed."

Besides miliary tubercles, Bayle also describes miliary granulations which are distinguished from the tubercles by being transparent, shining, of the consistence of cartilage and do not soften, and which Laennec looked upon as the first stage of miliary tubercles, although their discoverer did not.

Bayle's doctrines in regard to consumption were also important; he recognized six different forms, all depending upon different diatheses: "He denied finally, that phthisis ever originated in inflammation of the lungs, of the pleura, or of the bronchiæ."

"Through all these, mostly radically new views, the doctrine of phthisis underwent a reform which must be considered as an almost complete overthrow of doctrines which had reigned for centuries, and as an entire change of heretofore reigning ideas."

Bayle's doctrines were continued with some modification by Laennec [1781–1826], and his authority was so great as to make what he taught the generally accepted doctrine down to within a very few years past. Indeed it is probable that Laennec's views still rule the greater portion of the medical world. His discovery of auscultation, his promotion of percussion, above all "the wonderful power he exhibited in so modifying and rebuilding the pathology of the thoracic organs as to establish a complete harmony between it and the new mode of physical diagnosis," were sufficient reasons for this wide-spread and lasting influence. He taught that the granulations of Bayle were only a primary form of miliary tubercle; his description of the change of the miliary into "crude yellow tubercle" is termed by the author classic; but according to him this crude yel-

low tubercle always originates in the same way, whether found as nodules —"isolated tubercle"—or in irregular masses—"tuberculous infiltration;" the term "tuberculous matter" was therefore applied to all forms, and covered all the stages of change of matters deposited in the lungs.

"It is remarkable that Laennec did not recognize the danger to science of the adoption of the term 'tuberculous matter.' While he represented by 'tuberculous' so complicated an idea, which did not accurately express *one* quality or condition, but extended to, and included a succession of various stages of development, every application of the word to a case logically expressed a series of suppositions and consequences which, for the special case, was very often not—and, strictly speaking, never—susceptible of proof. If, for instance, a cheesy deposit in any organ was termed tuberculous, the hypothesis was thereby involved that this cheesy matter had been first gray, and more or less transparent and hard, that it then formed a crude yellow tubercle, and that it finally softened and passed into a centre of ulceration."

"How much Laennec was under the influence of this conviction, or rather of this prejudice, we can best see by the fact that when he observed these cheesy deposits in cancerous tumours, he did not hesitate to designate them as tuberculous."

Passing now to consumption: Bayle had made six species of the disease; Laennec rejected all but the "granular" and the "tubercular," but as the granulations were, in his view, only an early stage of tubercle, there remained only one form of this disease. "PHTHISIS ALWAYS DEPENDS UPON TUBERCLE." This became a dogma, and has maintained its sway over the medical mind down to the present time. As a consequence, "PHTHISIS AND TUBERCULOSIS BECAME IDENTICAL."

So in regard to scrofula:—

"Laennec breaks entirely with the old doctrines concerning the relation of tubercle to scrofula. Scrofula, which until now had played so important a rôle in science, and which had particularly predominated over tubercle from its discovery, was sunk suddenly by Laennec to an entirely subordinate position. While until now the term scrofula had corresponded to the far more general idea, and tubercle appeared only as a species of it, the tuberculous diathesis was now raised to the more extended idea, and the scrofulous affections of glands became only a variety of it." . . . "The general idea of scrofula has dwindled, and, since an exact basis is withdrawn from it, threatens to wholly disappear. The place of scrofulosis is occupied by tuberculosis."

Wide-spread and lasting as Laennec's influence has been, his views found opponents even among his contemporaries. Broussais especially combated them; his doctrine of "irritation," as the great principle of pathology, led him to far different conclusions, and inflammation became again a cause of phthisis. "Tubercle, or rather tuberculous matter, is nothing but a product of inflammation." With both Laennec and Broussais phthisis depended upon tubercle, but with the former it was a neoplasm, with the latter an inflammatory exudation. We have seen over what wide changes Laennec extended the term tuberculous; Broussais applied it only to the cheesy matter; the isolated or nodular form lost its particularity. Out of this came confusion.

"Contemporaries and successors adopted the apparent agreement in the doctrines of the two great masters; they identified phthisis with tuberculosis, and accepted the tuberculous matter as the essential point of tubercle. . . . . What is to be regretted in the contest of these two great men is not their opposition upon most important points, but, on the contrary, their agreement in uniting isolated tubercle with infiltrated by the use of the term 'tuberculous,'

and thereby establishing both as synonymous. In Laennec's and Broussais' doctrines was planted already the germ of the future division of miliary and isolated tubercles as neoplasms from the so-called tuberculous infiltration as a product of inflammation."

But the doctrines of Laennec found a far more formidable opponent in the great clinical teacher Andral, whose arguments were sounder than the hypotheses of Broussais. His great fault is stated to have been generalization from too limited a number of cases. His starting point was crude tuberculous matter, and not miliary tubercle. This matter he believed to have been originally fluid, and to have undergone a process of thickening; tubercle is therefore no longer a neoplasm, but a secretion product, and he inclines to the belief that it existed in the blood before being deposited. Pus, he says, he has more than once seen undergoing the process of inspissation, and changing into that form of matter universally termed "tuberculous."

"Andral knew then very well the process of cheesy degeneration, or, as it was at that time termed, 'the tuberculization of pus;' he describes, in the most precise manner, that form of inflammation which leads to caseous or 'tuberculous' products—those tuberculous deposits which, far from originating in gray, hard miliary tubercles, are nothing but thickened pus. By the establishment of these, in later times, ever more and more apparent facts, he earned the title of forerunner of Reinhardt and Virchow, and gave to Laennec's doctrines a most powerful blow."

He carried the application of his facts too far, however, in maintaining that all tubercle originated in this way. Laennec's "classic" description of the change from miliary tubercle into yellow he entirely ignored.

Another important doctrine of Andral's was, that the granulations of Bayle were circumscribed inflammation of the pulmonary vesicles, or "partial vesicular inflammations within the parenchyma of the lungs," a doctrine which, of course, removed them from all relationship with the tubercles of the pia mater.

"We see in Andral, consequently, that confusion which had been brought about by the introduction of the illogical term 'tuberculous,' already in full bloom. On the one hand, simple pus, when thickened to the consistence of cheese, is called 'tubercle;' on the other hand, the peculiar gray miliary tubercle is not tuberculous."

Into the particulars of his doctrines in regard to phthisis we cannot go, but give the summing up :—

"In accordance with this theory, and also sustained by practical experience, Andral held—with Broussais and against Laennec—*that inflammation, whether of the bronchial mucous membrane, of the lung tissue, or of the pleura, as well as hæmoptosis, may be considered as the most common cause of pulmonary consumption.*"

In support of Laennec's doctrines now appears Louis, who defines tubercle as the opaque cheesy matter—with whom "the original idea of tubercle as a nodule is entirely lost"—who denies, *in toto*, the origin of this substance in inflammation. His great influence established Laennec's doctrines upon a firm basis in France, but by no means ended the discord so far as other countries were concerned.

We do not deem it necessary, and it certainly is not possible here, to follow the various changes of the doctrines which now followed in Germany and England, however interesting it might be. Having shown, very briefly, how the confusion arose, and shown that there has been, in

the past, very high authority, practical as well as theoretical, for an inflammatory origin of consumption, we must pass over much that deserves our attention. In Germany the labours and doctrines of Meckel, Schönlein, Rokitansky, and Vogel, with the chemical researches of Simon and Lehmann, in England the writings of Alison, Addison, Carswell, and Clark, all contributed to the advance of the subject, although but few of them agreed either upon the minute pathology of tubercle or as to the origin of phthisis. Their differences and their agreements we cannot stop to point out, nor to indicate what each contributed which was new and valuable, but must hasten on to that latest period of the subject in which we live and take part.

The latest period in the doctrine of tubercle may be said to have opened with the microscopical study of the subject, and have reached its full development under the great teacher of cellular pathology. From 1841 to 1844 the investigations of Gluge and Lebert were published, and the appearance of the latter's prize essay in 1849—"*Traité pratique des Maladies scrofuleuses et tuberculeuses*"—placed the subject under the dominion of the microscope. The tubercle corpuscle became the characteristic sign of tubercle as the cancer cell was of malignant growths. Differing from every other physiological and pathological product, the red and colourless blood-cells, the pus corpuscles, etc., a certain and reliable means of deciding what was tubercle seemed at last to have been discovered. As these corpuscles are to be found in the affected glands of scrofula, the influence upon the doctrine was direct. But, we are told, Lebert was too good a *clinicien* and had had too much experience to be able to abandon the idea of scrofulous diseases as different from tuberculous; he therefore "held fast to the clinical idea of scrofula while he took from it all anatomical support." There is no scrofulous matter, but scrofula affects more the external parts of the body, and tubercle the internal organs. At that time, too, Lebert denied the inflammatory origin of tuberculous matter; now, we are informed in a note, he is inclined to consider not only tubercular infiltration, but tubercle as products of inflammation.

Scarcely were these doctrines spread abroad before they found not only opponents, but, according to our author, refutation, for Reinhardt in 1847 "proved" that the tubercle corpuscles may be formed from pus cells, and in an elaborate essay sought to prove that tubercle is in reality nothing but a product of inflammation. Further with his doctrines it is not necessary to go, for they were speedily overshadowed by those of Virchow; his wonderful powers were directed to the study of this important portion of pathology, and to the conclusions arrived at and doctrines taught by him we must give considerable share of our attention.

"In this condition Virchow found the doctrine of tuberculosis, as he began in this special subject as in all others of medicine, his epoch-making labours. It may be said that there existed at that time a contest of all against all; no principle was so universally recognized as not to be combated by facts; the confusion had reached its culminating point. Upon one side stood Laennec's theory, stoutly maintained with all its consequences by Louis; diametrically opposed to this were the doctrines of Broussais, Andral, and Reinhardt; Rokitansky's views resembled Laennec's, but with considerable modification of some important points; Lebert again presented Laennec's theory with other modifications; Engel agreed in some respects, but not entirely, with Andral and Reinhardt; Vogel stood midway between the contending parties.

"To bring order out of this general confusion Virchow was destined. It was clear that neither of the contending parties rested its claims upon mere

hypothesis; each of them was able to advance *facts*. But each party either ignored the facts of the other or nullified them by excessive scepticism, while from its own facts, the results obtained from a certain series of cases, it generalized beyond all bounds, and often followed them to the most extreme consequences."

Almost simultaneously with Reinhardt, in 1847, Virchow had proved that the cheesy matter, then universally designated as tuberculous, was not necessarily of a specific character, but was in many cases nothing more than *thickened pus;* that it may often be found even in the middle of malignant tumours, a fact already known, but wrongly interpreted—the microscope proved it to be in such cases a collection of *degenerated cancerous tissue*. He agreed, too, with Reinhardt in teaching that this "tuberculous" matter in the lungs of consumptives was very often the result of the inflammatory process—that it was undoubtedly inspissated pus.

"But happily Virchow did not arrive at the blind and too sweeping conclusion that therefore all tuberculosis was the result of inflammation, and to strike tubercle out of pathology as an independent formation. Rather recognizing on the one hand that the tuberculous matter might be an inflammatory product, he did not on the other hand surrender the old theory of Laennec, sustained as it is by exact observations, that primary gray miliary tubercles, to be considered as organized new formations, might also undergo the cheesy degeneration. The transformation into a tuberculous substance, as Virchow himself at that time termed it, or the 'tuberculization,' is consequently no specific process belonging to a certain dyscrasia, but a process which the most different pathological products, as pus, tubercle, cancer, etc., may undergo; it is *one of the various forms of retrograde tissue-destroying metamorphoses.*"

In 1852 Virchow proposed a new nomenclature of the subject embodying the views just presented. Holding fast to the idea of tubercle as a nodule, not a nodule of any structure whatever, but one having all the special characteristics which had been described as belonging to miliary tubercles since the time of Bayle, he restricted the term to these bodies alone:—

"In short the term tubercle *must be restricted to the neoplastic miliary tubercles or granulations*. On the contrary, that which since the time of Bayle, Portal, Laennec, has been designated as 'tuberculous,' must—because according to the latest researches, it is only a condition of matter in a certain stage of pathological change, because it does not, as held by Laennec, originate entirely and alone in gray miliary tubercle or gray infiltration, but may be derived from the most various pathological products, and therefore is proved not to be specific—necessarily receive another name, and none can be better adapted to it than that already frequently applied, that which designates its characteristic consistence, and appearance 'cheesy.' 'Tuberculous matter' therefore becomes 'cheesy' or 'caseous,' and 'tuberculization' 'cheesy metamorphosis.'"[1]

"With the separation of the two ideas of tubercle and cheesy deposit were the bonds finally broken which, since the time of Bayle, had restrained the free development of the doctrine of tubercle. Tubercle—*i. e.*, the gray neoplasm which generally appears in miliary deposits—in its farther progress *may* undergo cheesy degeneration; indeed, this is the customary termination, but this process has no *necessary* connection with tubercle, for the tubercle may pass through other kinds of metamorphosis, it may undergo the calcareous degeneration and obsolesce, or the fatty and ulcerate. Just as little as tubercle is exclusively

[1] On a previous page of the history we learn that Craigie, in his *Elements of General and Pathological Anatomy*, Edin., 1848, proposed the Greek term "tyrosis" for this degeneration, and "tyroma" for the substance.

bound to caseous degeneration is the caseous degeneration bound to tubercle; the most various pathological formations, among other metamorphoses may undergo the cheesy."

The author regrets that these views of Virchow, in regard to tubercle and tuberculosis, have found so little favour even among his own countrymen. Of late, he says, they are rapidly gaining adherents, and Niemeyer especially applied them clinically. Niemeyer occupies a high position as a writer and practitioner, and ranks among the best clinical teachers of Germany. He divides pulmonary consumption into two groups, one depending upon miliary tubercle, the other the result of chronic pneumonia. He goes farther than Virchow, however; it is not only a certain kind of pneumonia which may cause phthisis, but every simple inflammation of the lungs may result in it. While it is chronic catarrhal pneumonia which most frequently leads to caseous deposit and consequent ulceration of the lungs, and this is the most frequent form of consumption, the acute catarrhal and the croupous forms, also, frequently end in phthisis. The phthisis resulting from miliary tuberculosis is, therefore, according to Niemeyer, the only form *not* dependent upon inflammation for its origin. He also restores to honour the doctrine of the ancients, that *phthisis may arise from hæmoptysis.*

"The real miliary tubercle causes phthisis only in the rarest cases; it is rather, in general, a disease resulting from ulcerative pneumonia—a complication of an already existing phthisis. *The greatest danger to a consumptive is that he may become tuberculous.* Many of the best-marked cases of phthisis run their fatal course without tuberculosis, so that at the *post-mortem*, in spite of great destruction of the lungs, not a trace of miliary tubercle is to be found."

The sketch we have given and the extracts made from these two writers, will serve to show the direction of the current of the doctrine of tubercle in Germany—there is a decided tendency to settle down to something near the doctrines of Virchow and Niemeyer. It is different in France; there a confusion reigns greater than any which has yet prevailed. To try to trace out the conflicting theories of the various authors would be here a waste of time. We can only say that the latest important work on the subject is that of Empis, published in 1865. He holds views which are in some respects different from any other authority, and his nomenclature only complicates and confounds, if possible, worse than before. Two articles of his creed, however, deserve mention: one is a belief in recovery from miliary tubercle—a belief based upon post-mortem examinations, and the history of cases which are presented in his work; the other is that *miliary* tubercles are a product of inflammation.

The condition of the subject in France, then, is briefly given as follows:—

"Among the latest writers upon tuberculosis, Cornil and Herard occupy nearly Virchow's ground. The majority of French physicians, however, yet follow Laennec and Louis, and especially Lebert. The old doctrine of Laennec has been, in the latest times particularly, brought into vogue by Villemin. Added to these are the adherents of Andral and Cruveilhier, and in this variegated company stands Empis with his new theories, almost isolated."

The author having finished the history of the subject, enters, in the second section, upon "The present condition of the doctrine of tubercle, phthisis, and scrofula." It opens with a discussion of the nomenclature—a running commentary upon the different applications of terms by various authors. Enough of this has been presented, we think, to convince every one of the necessity there is for reform in this respect. Uniformity in the

use of terms is an indispensable requisite for further progress. Laying down the undeniable propositions that scientific terms should be used with such precision that they can be applied to but one thing—that a name should not carry with it the idea of a process—that its use should not imply any theory of origin or development, he justifies the preference he has shown for the nomenclature of Virchow, by the facts that the term "tubercle" agrees with the original meaning of the term as a "nodule;" that the word "cheesy" should be used because it strikingly expresses the characteristic appearance and consistence of the matter, and is not new, but has long been used by writers on the subject; that, therefore, this nomenclature is in entire harmony with the pathological truth, and with the historical development of the subject. Its adoption would bring order out of confusion, and neither promote, interfere with, nor conflict with any theories. Besides, it has already gained considerable ground in the scientific world, while the latest nomenclature of Empis, of "granulations" and "granules," only further complicates the subject, and has not been adopted to any considerable extent even in that writer's own country.

The subject of this section—the present pathology of tubercle, as derived from the best authorities of the present day—deserves brief statement. First of the "granulations," we have this paragraph of interest:—

"The term 'granulations' must be retained in science for a certain form of miliary neoplasms, which, it appears, are essentially different in character and development from the real gray miliary tubercles. It belongs to those fibrous or cartilaginous bodies particularly described by Andral, which are found on serous membranes, but also in the lungs, and which neither undergo cheesy degeneration nor, in general, softening. These bodies are colourless or clear gray, more or less transparent, and tolerably shining, often with black stripes running through them; of the size of lentils or millet seeds; generally rounded; mostly as hard as cartilage, in rare cases, however, softer; and are formed from fibrous tissue. Those found in the lungs are, according to Andral, with whom Virchow agrees, often only hardened lung vesicles. 'Others are,' according to Virchow, 'indurated conditions connected with bronchitic and peribronchitic processes.' The granulations have not, like tubercles and the cheesy hepatizations, a predilection for the upper lobes, but affect all parts of the lungs in like proportion. Whether we consider the granulations, not only of the lungs but of the serous membranes, with Andral, a result of the inflammatory process, or as simple fibrous neoplasms, and whatever their mode of origin, they differ from real miliary tubercle in their external appearance, and especially in their development; they remain as indurated points, or obsolesce and calcify, but do not become cheesy like tubercle. Whether these granulations depend upon a general diathesis, whether there may not be some genetic connection between them and miliary tubercles, upon what causes their existence depends, under what circumstances they arise, and what influence they exercise upon the general organism—these are questions which have not yet approached solution. The whole subject lies yet in entire obscurity."

It is not necessary to describe minutely the miliary tubercles, since their characteristic appearance is given by every author, and, whether strewn through the organs or conglomerated together as "isolated tubercles," they are well known. Microscopically, they are seen to consist of cells, with membrane, nuclei, and nucleoli; cells which "bear the greatest resemblance to the colourless blood-cells or the lymph corpuscles." They are very variable as to size and shape, their figure undergoing change from external force, or possibly from an internal power of contractility, which is not, however, yet proved.

As to the point of deposit of tubercles in the lung, there is, as is well

known, wide variation of opinion among authorities. We, therefore, give what is said upon this point:—

"The seat of miliary tubercles in the lungs is, so far as it can with any certainty be made out, the alveolar walls, formed of fibrous and elastic fibres, or the interstitial fibrous tissue found between the pulmonary lobules and lobes. The smaller and finest bronchia are the chief points of origin—not, indeed, the epithelial membrane, but the layer of fibrous tissue immediately under the epithelium and the peri-bronchitic fibrous stroma—finally the walls of the vessels."

"It is proved, thus far, that miliary tubercles, wherever they are found, have their origin in the fibrous tissue, or in tissues allied to it, osseous and lymphatic."

The order in which the different organs are affected by miliary tubercle does not differ much from the well-known scale of Rokitansky Their appearance along the line of the bloodvessels has been especially remarked by many independent observers, and is a striking fact connected with them: the external coat (adventitia) of the smaller vessels seems to be a favourite point of deposit for them, and this may account for their frequent occurrence in the choroid membrane, while in non-vascular tissues, like cartilage, they are never found.

"Among the membranes affected by miliary tubercle the choroid coat of the eye has been shown, in the latest times, by Cohnheim, to be of especial importance; not only has their existence, in general, and especially in acute tuberculosis, been proved *post mortem*, but even during life their presence can be discovered by the ophthalmoscope [von Graefe, Franke, Lebert], and thus an important aid to diagnosis during life is afforded."

The progress of the deposit of miliary tubercle is either acute or chronic. The former attacking simultaneously many organs, and running a rapid course, with symptoms much resembling typhoid fever. The latter spreading from the organ first affected, which is most frequently the lungs, and one deposit following another in succession and with more or less rapidity. In the acute cases the author deems it of the very first importance to look for evidences of a primary deposit from which the general infection may have proceeded. In the great majority of cases, when looked for, it has been found, and by such observers as Buhl, Rokitansky, and Virchow. Such primary points of departure of a tubercular eruption—infection-deposits, the author calls them—need not, necessarily, be themselves tubercular, but may be of the pneumonic cheesy nature. This is an important point, one upon which he lays great stress, and of which we shall hear more.

It remains to state the further stages of development of miliary tubercle:—

Among the *certain* terminations is Rokitansky's "obsolescence;" the tubercles shrink and dry, and remain as firm particles imbedded in the tissues, sometimes ossifying. Rokitansky held this to be the only termination of miliary tubercle; according to the author, it is the most seldom.

According to Empis, miliary tubercles not rarely become fibrous, and the cartilaginous "granulations" are therefore to be considered as healed tubercles. Further investigations upon this point are "as necessary as important."

Whether tubercle is capable of resolution, undergoing fatty degeneration and absorption, without affecting the tissue in which it lies, is not yet proved, although held to be possible by Virchow and Rokitansky.

Direct ulceration of miliary tubercles is frequent, especially in the larynx; they soften and ulcerate without first undergoing cheesy degeneration.

But by far the most frequent termination of miliary tubercle is its transformation into the yellow cheesy matter. It is a remarkable illustration of the confusion of doctrine which has prevailed, that even upon this important point there has been wide diversity of opinion. Andral, Reinhardt, Empis, and Rokitansky are arrayed against this view, although not agreeing upon other points. But the change has been so conclusively proved by Laennec, that scarcely anything can be added by later times to his argument.

"To every one not under the influence of some theory, Laennec's explanation of the facts will appear the simplest and most impartial; while, on the contrary, that of his opponents will appear forced and formed to agree with a pre-formed hypothesis. But Laennec himself is not free from blame for the origin of this conflict, since he laid down the proposition that all yellow 'tuberculous' matter must have proceeded from the gray substance. It was not difficult for his opponents to meet this statement; there were palpable facts from which could be shown a direct origin of yellow tuberculous masses which had not previously been gray tubercle. But now these facts were too widely generalized, and the transformation of the gray into the yellow tubercle was denied even for those cases in which unprejudiced observation was obliged to admit it. For us, who no longer call everything which is cheesy tubercle, the original conflict has lost its early and principal importance. We are far from claiming that all cheesy matter has been formerly gray and must have proceeded from tubercle; we recognize fully the possibility of its having very various origin; but we must, also, as concerns real tubercle, maintain Laennec's doctrine in its fullest extent, that the gray tubercle, generally first in the centre, and then gradually towards the circumference, changes into the yellow cheesy tubercle."

This yellow tubercle, the product of gray, exhibits the microscopic appearances generally given—the tubercle corpuscles with finer elements, molecules and granules. The corpuscles have been proved by Reinhardt and Virchow to be "not primary formations but shrivelled cells." The difficulty of determining in every case what is really true tubercle and of distinguishing it from the product of caseous inflammation is admitted; it is a point which has been urged by Lebert, but because it is sometimes difficult we should not, therefore, generally, or whenever possible, make the distinction; in the early stages it can always be made, and, besides, "even if two processes yield similar or perfectly identical products, we are not thereby justified in considering the processes themselves as identical."

As to the further fate of this pathological product, its absorption has not been proved, is improbable, but, according to Rokitansky and Virchow, its possibility cannot be denied.

It very frequently undergoes cretification or petrifaction, and is either encapsulated or thrown off by ulceration, recovery being the result.

By far the most frequent changes, however, is softening. Yet in the changing phases of doctrine even this "unimpeachable fact" has not been left unassailed, and upon this point we quote a suggestive paragraph or two the bearing of which will be better seen hereafter :—

"It must, indeed, be confessed that the softening and ulceration of products resulting from miliary tubercle can be but rarely proved with *positive certainty*. If an ulcer or a cavity be found, and in its neighbourhood miliary tubercles, it is generally concluded that the softened and broken-down mass likewise resulted from tubercle. But how can the objection be met with positive proof that the

ulceration may have resulted from an inflammatory process, and that the miliary tubercles are only secondarily developed in its neighbourhood? Why do we find so extraordinarily seldom—according to some authors, never—softened and ulcerated tubercles in the serous membranes, if the termination is the ordinary one, while in the lungs and intestinal canal, where there is a possibility of another explanation, ulceration is so frequent?

"By most authors it is, indeed, now admitted that by far the majority of the cavities found in the lungs of consumptives are the result of caseous pneumonic processes. So too the intestinal ulceration may depend upon follicular inflammation, and the tuberculosis on its borders be a secondary process."

There has always been a division of opinion among pathologists as to the point at which softening begins; one leading doctrine has been that it was the centre of the tubercular mass, another that it was in the tissues surrounding it. The author thinks the proof of the former irrefragible. Cruveilhier is the champion of the opposing doctrine whom he mentions, but it has been sustained among us by the high authority of Carswell. A microscopic examination of the softened tubercular mass, "which has been falsely called tubercular pus," shows nothing but a detritus besides the shrunken cells called tubercle corpuscles. There is no growth of young cells—

"This circumstance forms an important proof against Cruveilhier's doctrines and establishes the fact that softening does not result from a new cell formation but upon a necrosis and ruin of cells."

Pus cells are only found when the surrounding tissue is affected or a bronchus has been opened.

By softening is occasioned a defect in the organ, an abscess with constant inclination to spread by new deposit of tubercle in its walls, and further breaking down of tissue. Yet with favourable opportunity for emptying itself externally an effort is set up towards repair, and cicatrization may actually follow. The author refers to Laennec as speaking of the very great frequency of such cicatrices being found, and to the statement of Cruveilhier that it is very seldom the lungs of adults and aged persons are found without traces of such healing process about the apices. In the historical portion he gives Carswell the credit of having particularly described the healing process of phthisical lungs, and says that "pathological anatomy has never given stronger proof of the curability of any disease than of consumption." We may also here quote Bennett's statement that "tubercle is arrested spontaneously in one-third of all the persons in whom it occurs."[1]

"Although we may admit that among these lung cicatrices and healings of tubercle by far the greater portion were the result of cheesy inflammatory deposits and not of true tubercle, yet it is, nevertheless, certain that tubercular ulcers and cavities may also heal. *I have been able to follow, by daily laryngoscopic observation, and, although relatively seldom, yet in single instances with certainty, the healing of tubercular ulcers of the larynx.*"

But the great point of obscurity in our knowledge of miliary tubercle is as to its origin, the great question of to-day, the answer to which pathologists are impatiently awaiting, is—"are miliary tubercles a new formation *sui generis* or a product of inflammation?" We have seen the difference of opinion among authorities; in opposition to the inflammatory origin stand Bayle, Laennec, Louis, Virchow; on the other side Broussais, Andral,

[1] Practice of Medicine, 3d Amer. edit., p. 183.

Cruveilhier, and Reinhardt; while Lebert, originally with the first party, has changed over to the second. The opponents of the inflammatory origin plead the peculiar character of the bodies, so different from any recognized product of inflammation; they adduce the frequency of their occurrence without a trace of inflammatory action, and look upon it when present as a consequence of the tubercle irritating the tissues like a foreign body. On the contrary, the other party holds the presence of inflammation to be the normal condition, and looks upon tubercle without it as evidence of a terminated process; they admit the peculiar appearance which likens the tubercle to neoplasms, but will not admit that this proves them not possibly of inflammatory origin; Andral and Reinhardt of this party claim to have observed the miliary tubercles in an early stage of existence, a soft gelatinous condition.

In view of the possibility of inflammation yielding products other than those usually recognized, of the obscurity which yet hangs over the process of inflammation itself, the author leaves this question here undecided, and, especially in view of Cohnheim's discovery, thinks the whole question as to tubercle being an exudation must be examined and discussed anew.

Having traced miliary tubercle through its changes from gray to yellow, the author next considers that kind of yellow matter, generally known as "yellow tubercle," which has a different origin—"cheesy products not originating in miliary tubercle." This kind of matter is not tubercle at all, a fact to be carefully kept in mind by the student who has followed writers by whom the yellow is termed "true" tubercle, and by whom no distinction is made between yellow matters having a different origin. That this yellow cheesy matter is not tubercle is now, we are told, a "recognized fact as uncontested as any other in pathology." Andral first showed that simple pus in old abscesses would undergo thickening and become "tuberculous"—*i. e.*, take on this cheesy consistence and appearance; Reinhardt proved that the so-called yellow tubercle of the lungs and other internal organs might have the same origin; Virchow confirmed these views, and showed that cancerous tumours and various other pathological products undergo the cheesy degeneration. The yellow cheesy matter generally described as "yellow tubercle" is not then tubercle, but is an inflammatory product—

"I will here only bring forward a single fact which bears with overpowering weight upon the whole subject. There are certain species of animals in which every simple abscess has the inclination to this cheesy change. At the head of these animals stands the rabbit. If we injure one of these externally with sufficient violence to cause suppuration, there collects at the injured spot a purulent deposit which seldom opens outwards, but remains encapsulated under the skin. If this abscess be opened it contains no fluid pus, but a more or less thick matter of cheesy consistence exactly resembling the yellow tubercular matter. That in this case we have to do with true pus and not with tubercle is without doubt, and needs no further proof. It is, therefore, a matter of course that every one who uses these animals for experiment in regard to tubercle should not only recognize this fact but distinguish between cheesy matter and true tubercle, otherwise almost every rabbit will be considered tuberculous."

The yellow matter is found principally in the lymphatic glands and in the lungs. The changes in the former from simple hyperplasia of the lymphatic elements, or from simple inflammation, are traced but need not detain us; externally, these affected glands are the sign of scrofula; internally, they cause "bronchial phthisis," or "mesenteric scrofula," but pro-

test is made against such terms as "tuberculosis" of the mesenteric or bronchial glands. In the lungs these cheesy deposits show a marked preference for the upper lobes; the larger ones are diffuse, non-isolated, have no nodular projections from their exterior, are often surrounded by traces of inflammatory action, and in general as well as in particular give no evidence of an origin by confluence of smaller bodies like miliary tubercles. So markedly is this the case that the term "infiltrated tubercle" has been applied to them by Laennec and other authors who have recognized the difference in form but not in essence. Yet the difficulty of distinguishing this matter from the yellow tubercle—the product of miliary—is acknowledged to be great; to ordinary examination it is impossible:—

"Also microscopically the appearances are strikingly similar; in the earlier stages of the cheesy hepatization the unchanged pus corpuscles scattered through the whole structure can be plainly recognized, but in more advanced stages of inspissation the pus corpuscles are, for the greater part, shrivelled into the same bodies which, in yellow tubercle, are known as Lebert's tubercle corpuscles. . . . . If the process of retrograde metamorphosis be still further advanced, all criterion of a differential diagnosis is destroyed. The cheesy pneumonic deposits go through the same changes as yellow tubercle; at the best they can become cretaceous, but generally they soften from the centre towards the periphery, vomicæ are formed which empty themselves externally, the softened masses are eliminated, and the cavities heal by cicatrization or by the formation of fibrous sacs."

But if the difficulty of distinguishing the larger cheesy deposits from tubercle is great, it is still greater in regard to the smaller which occupy the alveolæ of the lungs:—

"These alveolar deposits may be, like tubercles, very small, the size of millet seeds; also circumscribed and isolated, so that even the most experienced observer may be in doubt as to a decision. It may, with full right, be maintained that many of the principal authors have used these small cheesy deposits as patterns for their description of miliary tubercle, and yet they are nothing but thickened pus. The cheesy mass here fills entirely the alveolæ and the cavity of the smallest bronchia; frequently the matter may be pencilled out and the bronchial walls left free again. If gray tubercles are not to be found in the surrounding parenchyma, or more remote, the diagnosis is rendered easier; if, on the contrary, true tubercles are combined with these deposits the decision is frequently, in individual cases, impossible."

We must give now the author's nomenclature dependent upon these pathological views. Tubercle and cheesy pneumonia both cause phthisis or "consumption." There is a form of phthisis caused by miliary tubercle alone, uncomplicated with any cheesy deposits whatever; this is "*pulmonary tuberculosis*," and is "one of the greatest rarities," for the tendency to complication is great. Far more frequently is cheesy pneumonia alone the cause of phthisis, and attacks of it are "the beginning of the disease in the great majority of cases;" this is *phthisis simplex*. As soon as symptoms indicate that tubercular deposit complicates this form the term *tubercular phthisis* is applied to the disease. "In many cases a differential diagnosis can be made during life, may even be easy, and at least it is always useful to attempt it. In many cases, on the contrary, it is difficult or even impossible."

What are the causes of this cheesy degeneration, or *tyrosis*? (to use the Greek word, which, perhaps, had better have been adopted). The question bears very closely upon the etiology of scrofula and consumption, and is therefore of the highest importance, for it must be remembered that the

consumption dependent upon cheesy pneumonia is held to be by far the most frequent. In his answer to this question the author takes the ground that this tendency to tyrosis is a *local* rather than a *constitutional* affection. The constant result of traumatic irritation in rabbits[1] is admitted as a strong argument in favour of the constitutional view, but that in man there is ever a general tendency to cheesy degeneration of pus in whatsoever part of the body formed is denied. The tyrosis shows itself almost universally in the lungs; it is therefore local, and we are to look to local causes for its existence. An abnormal structure of the thorax and consequent interference with the function of the lungs may possibly explain this disposition to tyrosis, but the impossibility of pointing out the particular deformity is admitted. The narrow and constricted chests of consumptives must interfere with the flow of blood through the lungs, and the question is started whether a certain relative dryness, or want of blood in the parenchyma may not account for it. In connection the small quantity of water consumed by the rabbit, the scantiness of its urine, and hardness of its feces are commented on as facts possibly bearing on the point. He then considers Rokitansky's doctrine, that cyanosis or venosity of the blood caused by mechanical affections of the circulatory and respiratory organs affords an immunity from phthisis, and the various instances are adduced. Traube, too, holds that diseases of the heart afford an immunity to caseous pneumonia, but only those diseases "in which the exit of the blood from the pulmonary veins is in great degree hindered and in consequence of this a transudation of the serous part of the blood into the pulmonary parenchyma is favoured." It is an important fact, too, that, on the other hand, a congenital constriction of the pulmonary artery gives a marked predisposition to pneumonia with cheesy deposits. Reference is given to other authors besides Traube, who have observed and noted the frequent connection of pulmonary consumption with stenosis of the pulmonary artery; they are Farre and Travers, in 1815; Gregory, 1822; Louis, 1826, and more lately, Frerichs and Lebert. From all the facts it appears that

"This combination is not an accidental one, but that in fact individuals affected with a constriction of the pulmonary artery, or of the mouth of the same, are markedly disposed to pulmonary consumption, while the percentage of those dying of this disease among those affected with this lesion is uncommonly great."

Among the cases of this kind reported there were twelve in which a high degree of cyanosis was present; consequently it cannot be the cyanosis which affords the immunity to phthisis; the hindered flow of blood to the lungs would rather seem to be the causative circumstance, and numerous instances are adduced to show that whatever favors a flow of blood to the lungs affords protection from consumption, and *vice versâ*.

"The surprising rarity of phthisis among high mountains is explicable according to our hypothesis. By the influence of the lessened atmospheric pressure, and the increased lung action consequent upon ascending heights, the flow of blood through the lungs must be increased. These men easily acquire acute pulmonary inflammation, but the products of it, on account of the fulness of the lungs with blood, manifest but little disposition to undergo caseous degeneration."

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[1] The author admits that abscesses, containing very thin putrid pus, are sometimes formed in these animals, but only when putrid matters have been introduced into the wound, or after great and long-continued irritation.

What is now the explanation of scrofulosis? Why do diseased glands in scrofulous persons undergo cheesy degeneration, while in healthy subjects they undergo resolution, or yield laudable pus? The answer shows a belief in a local rather than in a constitutional cause.

"Scrofulous persons have simple abscesses, with fluid pus close to cheesy lymphatic glands, and frequently enough pulmonary inflammations running a normal course, so that no general disposition to tyrosis is perceptible. This process remains limited to the lymphatic glands."

Scrofula, then, is a "constitutional anomaly in which the lymphatic glands have an abnormal tendency to disease, and possess a local disposition to undergo cheesy degeneration."

We may thus briefly sum up his doctrines upon cheesy degeneration, or tyrosis. It is a peculiar change, especially liable to occur in certain *parts*, as the lungs; its occurrence there is opposed by any malformation or disease of the chest, heart, or arteries which promotes a damming up of blood in the pulmonary parenchyma, and *vice versâ*. Certain pathological products are especially liable to undergo this degeneration, as tubercle, enlarged lymphatics, and the diseased intestinal and mesenteric glands of typhus; the cause of the change is local rather than constitutional.

"Wherever tubercle and the typhous glands appear, let the constitution of the individual be what it may, these structures will, from their own nature, undergo tyrosis, *i. e.*, the disposition to the degeneration is in themselves, not in the constitution of the affected person."

The questions which yet remain open in regard to tubercle, and especially in regard to the connection between it and caseous pneumonia, and the relation of both to scrofula, are numerous, important, and intricate. Some of them, it is to be hoped, may be solved by the information derived from the inoculation of tubercle; and to this subject the third section of the book is devoted. It opens with an historical sketch of experiments in this direction, and, German-like, begins with the first investigations made in studying the contagiousness of scrofula, and gives every step in the progress of our knowledge since, from the accidental inoculation of Laennec's finger to the latest investigations, and including all that has been done in the study of glanders, embolia, and other diseases. It is not necessary for us to go farther back than Villemin. The presentation of his memoir to the French Academy in December, 1865, marked, as before said, a new era in the subject, and not alone by the addition it made to our knowledge, but also by the new zeal and interest it awakened in the study of the subject, and which has already carried us far beyond the advance point then reached. In this memoir, and in a complete work[1] published in the winter of 1867–8, the following propositions were laid down:—

1. Tuberculosis is a specific disease.
2. Its cause resides in an inoculable agent.
3. The inoculation of rabbits from man readily succeeds.
4. Tuberculosis belongs, consequently, to the zymotic diseases, and should be classed nosologically with variola, scarlatina, and syphilis; better still, with glanders.

In making the experiments upon which these propositions are based, he used indifferently miliary tubercle and the infiltrated matter of cheesy

[1] Etudes sur la Tuberculose; preuves Rationelles et Experimentales de sa Spécificité et de son Inoculabilité. pp. 640. Paris: Baillière, 1868.

pneumonia, calling both "tuberculous." But one important point remained yet incomplete. Villemin was justified in pronouncing tubercle inoculable, but it remained to be shown whether tubercle alone, and nothing but tubercle, would produce tubercle when inoculated. Our author says that he contented himself with but few experiments upon this point, and consequently laid down the doctrine that tubercle is a specific affection, most closely allied to glanders, producible alone by a virus, which must be inoculated, inhaled, or introduced into the system by contagion, and denied hereditary influence, constitutional disposition, pneumonias, catarrhs, and hæmoptosis as causes of consumption. To Villemin everything that produced tubercle by inoculation was tubercle; the caseous matter of pneumonia and of diseased glands gave successful results in experiment, therefore they were "tuberculous." But the range of his experiments had not been wide enough; a fact of prime importance had escaped him; one more interesting of itself alone, more influential upon doctrine, and more important practically than any with which he had astonished the scientfic world. This fact is, that the inoculation of many other matters besides tubercle, matters of the simplest kind, and which must act mechanically alone, will produce tubercle. Its mere statement shows its importance; the wide field of inquiry opened is revealed at a glance; in the brief period which has elapsed since their publication Villemin's labours have become but a stepping-stone in our path of progress. We commend this striking fact to the careful consideration of those who, perplexed by the conflicting doctrines which have succeeded each other, and forgetful of the intricacy of the subject under investigation, have been tempted to sneer at the uncertainty of medical theories, as well as to those who, looking only at what remains yet unknown, would despair of further effort. Scarcely were the sheets which presented Villemin's discoveries to the scientific world dry from the press, before pathologists were submitting them to examination by experiments, which were varied in every possible manner, and by which the chief result obtained by him, the inoculability of tubercle, was confirmed, but his doctrines, in many respects, shown to be untenable, and great and unexpected additions made to them. In Germany, Lebert and Wyss; in France, Colin, who headed the commission of the Academy to examine Villemin's memoir; in England, Andrew Clark, Simon, Sanderson, and Wilson Fox, were the principal ones who followed up the work. The three latter fully established the important fact that not only the inoculation of matter other than tubercular would cause tubercle, but that a long-continued traumatic irritation, as a seton, also gave rise to it. Upon this fact Fox bases views as to the cause of tuberculosis identical with those which the author says he himself had published six months previously.

In the brief sketch of the important results gained by experimental inoculation, we have anticipated the subject so far as our author's labours are concerned. His own experiments began in January, 1867, first to test the specificity of tubercle set forth by Villemin, but continued with a rapidly extending plan as new facts were observed. They were so numerous, of such character, so well conducted, and with such results as fairly to rank him among those whose names have been mentioned, and to whom we are indebted for much important advance in our knowledge. The details of his experiments occupy over one hundred and fifty pages of the book; to attempt any detail of them is impossible here, yet some statement of their extent and character, and of the results gained, seems

necessary to an understanding of the concluding portion of the work. We will merely sketch them as they are classed in series.

FIRST SERIES: *Inoculation with fresh and softened gray miliary tubercle.*—Number of animals experimented on, 20. In 12 of these the inoculation failed entirely, a strikingly large proportion. Of the 12, 10 died in from two to ten days of septicæmia. In the 8 successful cases tubercles were found, and generally in more than one organ, and "tubercles that both macroscopically and microscopically showed the most perfect analogy with the miliary tubercles of man." A critical examination of the experiments gives prominence to the following points:—

A lack of correspondence between the local and the general affection. In the best marked cases of tubercle in the internal organs, not a trace remained at the point of inoculation.

The necessity of a certain duration of life for the production of tubercle after the inoculation seems to be shown by the results; yet there is no constant relation of this kind, as the following series will show. Ten days may be looked upon as an unusually early period for the affection of internal organs, and "only in rare cases will the general affection take place before the third week."

The successful cases followed, in by far larger proportion, the inoculation of softened tubercle.

SECOND SERIES: *Inoculation with the products of cheesy pneumonia and pus from the cavities of consumptives.*—Number of experiments, 5. Result negative, the animals dying in every instance within ten days, of septicæmia or pleuro-pneumonia. The limited number of this series is regretted by the author, but arose from the difficulty of obtaining inoculable matter from cases in which there was known to be no tubercular complication; but the possibility of successful inoculation of cheesy material has been meanwhile established by other experiments, as below:—

THIRD SERIES: *Inoculation with the non-tuberculous cheesy matter of lymphatic glands extirpated from a living person.*—These experiments were to afford a crucial test for the decision of the question, whether miliary tubercle could be produced by inoculation of cheesy matter alone, and certainly not tuberculous in the sense the word is used here. Septicæmia was not to be feared, and the objection of a post-mortem infection could not be advanced against them. Seven experiments: one died of pneumonia in fourteen days; two negative results; four not only successful but "brilliant." In all the liver was full of miliary tubercles, in three the lungs also, in none was a single organ alone affected. The following points are impressed:—

Entire want of local affection to account for the general infection.

The impossibility of discovering any difference between the tubercles produced and those of the first series.

A frequency of success by inoculation of this scrofulous matter rather above that obtained with tubercle.

The destruction of all foundation for the objections that the results of inoculation are due to introduction of post-mortem matters, or to pyæmic processes.

FOURTH SERIES: *Inoculation with thickened pus from the inoculated point of an animal already inoculated either with tubercle or cheesy matter.*—This series was undertaken because, according to Villemin, the abscess forming at the point of introduction is tubercle; the author could see only, in the few cases in which it occurred, the thick cheesy pus which

always follows traumatic irritation in rabbits. According to Villemin, too, the local irritation bears to the general affection the same relation that chancre does to syphilis! Of the eight experiments, two were negative, and six successful. But besides mere success as to tubercle, other effects were produced which the author deems important.

In the two cases in which no tubercle was found, there was marked hyperæmia of the internal organs, generally with evident disposition to the formation of cheesy-purulent deposits; in one of them centres of hemorrhage in the lungs, fibrinous clots in the heart. In the six successful cases, in addition to the tubercles, there were evidences of internal inflammations—pericarditis, and myocarditis, swelling of cervical glands, and hemorrhagic centres in the lungs. In four of the cases, the miliary tubercles were found only in the liver, and it is remarkable that in two of these, not more than five days had elapsed since the inoculation.

"We believe ourselves justified, nevertheless, in direct consideration of the post-mortem results, in ascribing the liver affection to the preceding inoculation. *The diseased process in both these cases was evidently much fresher* than we have ever observed it in any other cases. In the animal which died four days after the inoculation, *the origin of the whitish nodules, here very fine, just visible points, could be seen in the plainest manner within numerous small circumscribed centres of inflammation or at least hyperæmic areas.* In the animal dying on the fifth day there were also extraordinary small white points present, but the inflammatory areola around them was much less plain."

FIFTH SERIES: *Inoculation with pathological products non-tubercular in character*:—

a. With cancerous matter. Five experiments, all negative, except the local results which do not concern us here.

b. Two experiments with the hepatized lung substance of a person who died of "croupous" pneumonia, and

c. Three with catarrhal sputa yielded negative results, the animals dying with symptoms of intense blood-poisoning.

d. Subcutaneous injection of pus. Three experiments with human furuncular pus; all died of pyæmia. Then to procure healthy animal pus, issues were made in a rabbit and a guinea-pig, and the pus of these used. Of three rabbits injected, all failed; of three guinea-pigs, all were successful, and showed "miliary tuberculosis of the lungs, liver, spleen, kidneys, and some glands in high degree." In two of these, the author feels assured that he found miliary tubercle in *process of healing.* It took place coincident with return of warm weather and green food, and increase of flesh and improved appearance followed the evidences of severe illness, as he has observed it to generally follow in animals on the return of spring; they had to be killed for the examination, and the evidences of healing were, a deposit of pigment in the neighbourhood of the lung tubercles, and in a cartilaginous change, or fibrous metamorphosis, while softening was not to be found in any.

"The larger cartilaginous, pearl-gray nodules are in every respect analogous to the granulations which are not seldom found in the lungs and in the serous membranes of subjects dead of any disease whatever, and which are often combined with true tubercles. From the result of the examination of these animals, it is in the highest degree probable, indeed even certain, that the cartilaginous granulations formed in them were healed miliary tubercles, and that consequently a cartilaginous transformation is one process of healing in tubercle."

These facts seem assured from the results of experiment thus far:—

Tubercle is produced, not merely by inoculation of tubercular and cheesy matter, but by introduction of matter certainly not tuberculous.

Successful inoculation, however, follows the introduction of miliary tubercle and the cheesy matter of lymphatic glands, much more frequently than other substances.

The development of the general tuberculosis bears no relation to the local effects of inoculation.

SIXTH SERIES: *Inoculation with tubercle and cheesy matter taken from preparations which had lain several months in alcohol.*—The results of such a class of experiments would, of course, decide the truth or falsity of Villemin's assumption that inoculation depended upon a virus, and that the inoculated material must be fresh; they would also settle any question relative to inoculability depending upon a vital property, such as cancer-cells may be presumed to possess. The success attained was beyond expectation: of six animals one died without any result in sixteen days, all the others were markedly affected, and in most of the internal organs; there was no local irritation at the point of inoculation, and no septicæmia excited. The fact was firmly established that the substance preserved for months in spirit was equally efficacious with fresh tubercle; but to meet any possible objection which might be raised as to a chemical infection matter other experiments were made.

SEVENTH SERIES: *Inoculation or subcutaneous injection of tubercle or cheesy matter submitted to intense chemical action.*—The substance inoculated was submitted to the action of fuming nitric acid, boiling-water heat, or in some cases of permanganate of potassa or chromic acid. Of six experiments three gave a negative result; of the three positive, the effect was limited, thus the lungs were free in all, yet other organs were sufficiently affected to establish the efficacy of the inoculation of matter thus chemically acted upon.

But from this series the author claims to derive very important support to his peculiar views. All chemical influence, all animal virus must have been destroyed, therefore

"The substances must have produced their effect alone by their structure, their unchanged morphological constitution of very minute elements. These elements, although changed by intense chemical action, retained, as the microscope proved, their external form, only somewhat shrivelled. Briefly expressed —*matter morphologically (or physically) the same, although thoroughly changed chemically, acts the same as the original matter.*"

This view being taken the negative results of this series become instructive. Thus in two of the experiments the substance from lymphatic glands was so acted upon by fuming nitric acid as to become almost entirely soluble, its corpuscular elements were entirely destroyed, and the results were negative. Another case in which the same substance was used the result was positive, but in this one an abscess with cheesy pus formed at the point of puncture.

"It is thus possible that not the inoculated substance itself, but the cheesy pus produced by its irritation, its particles being absorbed, causes the infection."

Upon this failure of the inoculation of non-corpuscular, and success of corpuscular matter, however much changed chemically, he lays great stress.

EIGHTH SERIES: *Inoculation or subcutaneous injection of chemically*

changed non-tuberculous substance.—Four experiments, three successful, and with a success exceeding all others. The matter used was muco-purulent sputum of a person suffering from chronic pharyngitis, but otherwise healthy, thus with not a trace of tubercle or anything resembling it. The success was striking because the extent to which the internal organs were affected, and the different forms of affection, exceeded all other cases witnessed. Thus one animal had miliary tubercles in lungs, pleura, pericardium, peritoneum and omentum, liver, kidneys, spleen, lymphatic glands, heart, and pia mater; also cavities in the lungs, spleen, and in one lymphatic; one eye was affected with suppurative keratitis, iritis and perforation of the cornea, the other had miliary tubercles in the choroid coat. In another subject of experiment, were extensive cheesy hepatizations of both lungs, and with them miliary cheesy deposits. A good deal of space is occupied with the details of this series, and we can do little more than indicate the character of the results.

NINTH SERIES: *Introduction of coloured substance.*—This series was begun with the use of tubercular matter coloured so as to test the possibility of thus tracing it, and continued by the use of the colouring substance alone, and of these, aniline blue is by far better adapted for experiment than indigo or any other. This is the largest series of all, and we can only make a few extracts from the summing up.

"Glancing first over those experiments in which tubercle or cheesy matter was introduced in intimate mixture with aniline blue, the important fact presents itself, that in the miliary nodules excited by inoculation, the presence of the colouring matter was most evident. Since the aniline blue was not in solution, but in corpuscular form, so it is proved that such elements introduced into the subcutaneous tissue are carried to and deposited in the various internal organs.

"The vague assumption of some contagious juice which is absorbed cannot be made to explain the operation of tubercle inoculation, *but it is established that the inoculated elements as such, either by the lymph or the bloodvessels, can be taken up and carried to the different parts of the body.* It is further *ad oculos* demonstrated *that the corpuscular elements of the inoculated matter are found in the artificially produced tubercle.*"

Considering the objections that may be made, he nevertheless believes that—

"The corpuscular elements taken into the blood from the inoculated point are the only and true cause of the formation of miliary tubercles in the various organs.

"It is also established that the coloured elements found in the tissues have passed out of the bloodvessels, for they only could have arrived at the different organs by means of the vessels, either lymphatics or principally bloodvessels."

TENTH SERIES: *Inoculation or injection of blood.*—These experiments consisted partly in subcutaneous injection, and partly of injection into the trachea, the blood being of healthy animals, and either fresh or boiled. They were undertaken to see if blood, other than that of a consumptive, might not produce tubercle, and in this seem to have been successful; also to investigate the influence of hemorrhages into the lungs. Besides the influence in producing tubercle, a decided tendency to intense inflammation with cheesy deposit, and to local pulmonary hemorrhages was manifested.

"The gray-white points and nodules within the hemorrhagic centres in the lungs deserve very particular attention; they are the beginning of miliary bodies—whether of inflammatory or tubercular nature remains undecided—which occur in company with extravasations of blood."

ELEVENTH SERIES: *Traumatic irritations.*—Four experiments of this kind are given, all failures, yet he admits the positive results obtained by Sanderson and Wilson Fox outweigh any amount of negative results.

"Only this much may be probably justly maintained, that the production of tubercle by traumatic irritation is not a usual occurrence, but, when it occurs, must be considered a rarity."

The brief sketch we have given will suffice to show the character, range, and results of the author's experiments, as well as to indicate the direction in which they are leading him. His summing up and general consideration will of course present his views more fully. The sources of error seem to have been carefully considered; he claims that by long-continued helminthological investigations and minute study of inflammation he has become familiar with every nodule and particle likely to be mistaken for tubercle; there are many such, most of them entozoa, and some have deceived experienced observers, so that he lays it down as an absolute rule that no body should be accepted as tubercle in these experiments until the microscope has confirmed the other modes of examination.

He considers at length the question, "Are the artificially produced nodules really miliary tubercles?" We shall not follow him because so many independent observers have arrived at the same conclusion, that the fact has been established, and the question needs no controversial examination. If Virchow, not only in private, but in his public lectures, accepts these bodies as tubercle, we may consider the question as definitely settled.

But are these tubercles really the consequence of the inoculation, or are they not rather accidental formations? This is an important query; one upon which hinges the whole subject. Those who claim that tubercle is of frequent occurrence in animals, are those who look upon the cheesy matter as tubercle; we have seen that the author is not one of these; he carefully distinguishes between the two substances, and he and all authors who thus distinguish do not believe in the frequent occurrence of tubercle in animals.

"A true miliary tuberculosis in animals either does not occur at all, or at least is one of the greatest rarities. Virchow declares expressly in his work on tumours *never* to have seen gray miliary tubercle in them, and scarcely any one has had greater opportunity for observation than Virchow."

His own observation corresponds with this. In all the animals he has examined, looking out every nodule and point for parasites and entozoa, he never found miliary tubercle. Animals are termed tuberculous "from the confounding of terms already so much dwelt upon."

Villemin kept his inoculated and non-inoculated animals in the same cage, and under perfectly similar circumstances; the one had tubercles, the others were always found healthy.

Farther, those animals inoculated by the author which died of septicæmia had no general tubercular infection; some of them certainly would have had, were their occurrence dependent upon mere accident.

The number of the author's experiments was 104, and there were used 71 rabbits, 28 guinea-pigs, and 3 horses. Of 100 experiments, 34 gave positive, 9 doubtful, and 57 negative results. Without going into particulars, we may give the following lessons of the percentage:—

"1. Inoculation with non-tuberculous and non-caseous substances, such as chemically changed catarrhal sputa, is not less successful than with tubercle

and cheesy matter; 2, inoculation of substances such as aniline blue, carmine, and blood, produces tubercle, but in general far more seldom than tubercle, cheesy matter, sputa, and pus; 3, that success is most seldom—in our own experience never—with simple traumatic irritation and carcinoma."

The relative frequency with which the internal organs are affected is different in animals from man, the liver heading the list; thus the liver was affected 26 times, the lungs 21, the intestines 14, mesentery 12, spleen 11, kidneys and lymphatics each 10 times.

Re-stating the facts obtained by the experiments he asks the questions how these tubercles are produced? what *common element* is there in these varied substances to produce a common effect? It cannot be a virus, as Villemin held, for the substances are too heterologous; it cannot be a chemical property, or a contagious vital liquid.

"The common element is to be found most simply in their *morphological constitution.*

"All the substances efficient as inoculating agents agree herein, that, as shown by the microscope, they consist of very fine formed particles which are smaller, or at least not larger than the colourless blood corpuscles, that they thus consist of elements which can circulate with the blood without causing embolia or stoppage of the vessels."

Looking at the facts—especially at the fact, indubitably proved, that coloured particles thrown into the subcutaneous tissue are found in the internal organs with tubercle—he cannot escape the conclusion that thus do the particles of all inoculated substances enter the blood, are deposited and cause tubercle.

"It is proved that the fine corpuscular element is as such absorbed and enters into the blood. It is farther proved that these elements are afterwards to be found in the various internal organs. Finally, it is proved that the artificially caused tubercle contains in itself the morphological constituents of the inoculated material."

The first objection to this theory is that general tuberculosis follows the introduction of such substances as cotton wool, or a seton, as in Wilson Fox's and Sanderson's experiments, and the consideration of this leads to the statement of a very important part of his views:—

"In all these cases there was present a local suppuration as consequence of the traumatic procedure. This secondarily produced pus could be as well absorbed as the substances consisting of fine elements in the inoculated animals. There is therefore no proof against our theory in this, much rather may the results of these experiments be shown to be in harmony with it. In all these cases in which tuberculosis followed a pure traumatic influence there was a *self-infection.* We must thus far extend our theory: *that not only a foreign substance made up of fine particles, and introduced from without, can cause the production of tubercle, but also fine corpuscular elements present in the body, or abnormally produced in it, may have the same effect.* This very fact of self-infection is extraordinarily important in order to clear up the etiology of tuberculosis in man, as we shall see."

Is tubercle an inflammatory product? This question was postponed, as we have seen, until it could be viewed by the light derived from experiment. Can it be answered now? To reply would necessitate an answer to another—what is inflammation? According to the author, we do not yet know the chief point of this process; seemingly settled but a short time previously as in the tissues, by Cohnheim's discovery it has been carried back again to the vessels, and the whole subject once more thrown into "violent fermentation." But Cohnheim's discovery refers to the acute process

alone; how is it with the chronic, the products of which in some instances much more closely resemble neoplasms? The results of experiment differ; in some of the animals an exquisitely well-marked inflammatory areola surrounded the miliary tubercles, while generally these bodies show no trace of vascular action. Which is the beginning and which the terminating process? He is of opinion, that experiment will yet decide this question, and his suggestion to study the age of tubercle by injection of different colouring matters in succession at different periods of time seems well adapted to solve it. At present he looks upon the formation of tubercle as a process at least allied to inflammation—a deposit following an irritation and thus analogous to an inflammatory product.

"Looking upon tubercle, then, as an irritative deposit, wherein is to be found we would ask, the real essence of tubercle, that which to it is alone peculiar?

"The characteristics of tubercle, in my opinion, are, besides the lymphatic character of its elements, 1, its occurrence in miliary deposits; 2, that these are not single or limited, but occur simultaneously in numerous parts. These two characteristics are derived from the etiology of tuberculosis. *The essence of tuberculosis consists in its being an absorption disease (resorptions-krankheit), which owes its origin to the reception of very minute particles into the blood, and the presence of these particles is expressed by the occurrence of numerous scattered centres of deposit.*

"*We thus seek the characteristics of tubercle less in the single nodules, but much rather in the general character of the disease.* According to this view, the single tubercles may be held to be products of inflammation or miliary abscesses; if only the general disease is made up of a general or at least a widespread occurrence of these miliary nodules of lymphatic character the essence of tuberculosis is assured.

"According to this view we can lay no weight upon a scrupulous separation of the true gray miliary tubercles from other miliary deposits, especially from those yellow miliary nodules whose origin from pus or from gray tubercle is uncertain. Nature knows no systems; she never draws the rigid lines which render artificial systems presentable. Everywhere in nature we find transitions, which are difficulties for the heads devoted to systems, but which are necessary that unity may be assured throughout her dominion."

We are compelled to pass over many points of interest and proceed to the fifth section, the most interesting portion of the work: "The application of the results of experiment upon animals, to tuberculosis and pulmonary consumption in man." That his theory may not be misunderstood, we copy his re-statement of it in the following formula:—

"*Miliary tuberculosis is an absorption disease; it originates from the reception into the blood of very fine corpuscular elements, and the deposit of the same with consequent nodule formation in numerous scattered points of the various organs.*"

"Tuberculosis is consequently a *general* disease; in a certain sense it is also a *blood* disease, but it is not a specific affection. It stands in nosological classification in the nearest relation to pyæmia of all other diseases, which is also a non-specific absorption disease. Pyæmia, likewise, forms scattered centres of disease through various organs, but they are larger than those of tuberculosis, and are of inflammato-purulent nature. . . . . In tuberculosis, the elements are small and finely divided, and do not appear extremely irritating in character, wherefore, instead of pronounced or considerable inflammation, they give rise only to the formation of small miliary centres or foci."

To the support of this theory he devotes the section under consideration, and his first argument is derived from the fact that other men, studying the subject as pathologists and clinically, have arrived at views and stated theories very similar to those which he has derived from experi-

ment upon animals. The particulars of these theories, both accordant and discordant, are given and commented upon. We can only briefly allude to them and their authors. The first is Buhl; he examined, of acute miliary tuberculosis, twenty-three cases, and in twenty-one of these found either cheesy infiltrations or cavities in the lungs; he has been led to look upon the latter as the cause of the tubercles, and calls tuberculosis "a specific absorption and infection disease." Hoffman has sustained Buhl in all except the specificity; he has proved that the cheesy deposits precede and cause the tuberculosis, and calls this "a disease consequent and dependent upon the accumulation of caseous detritus matters in the body." Dittrich's theory is said to have been more widely received; it attributes the disease to "the reception into the blood of the matters of retrogade metamorphosis, and a peculiar crasis produced thereby, especially an affection of the fibrous element."

Niemeyer has modified Buhl's theory in some important points, and his modifications approximate him nearer to our author. The quotations and references are to works of Niemeyer not so recent as are now accessible to the profession of this country. Since the seventh edition of his work on practice has been translated and published, we prefer to refer to that.[1] We will briefly state, then, that this eminent authority agrees with our author upon the following points:—

Hæmoptysis may occur without dependence upon tubercular deposit, either incipient or established; a contrary opinion is "altogether unwarranted, and fraught with danger to the patient."

Of all foreign bodies which, by irritation of the bronchial walls and air vesicles, give rise to consumption, the blood of a pulmonary hemorrhage most frequently has this effect.

A denial of the doctrine of Laennec that consumption is only of one form, and a distinct recognition of the fact that it is "much more frequently a result of chronic inflammation than of tubercular deposit."

The cheesy deposits, generally termed infiltrated tubercle, are not tubercular but products of inflammation.

The frequent coexistence of the two pathological products "suggests a causative connection" between them; "in a great majority of instances" the tuberculosis is a secondary process dependent upon the caseous deposit.

(That the caseous "infection-deposit" is not *always* found, is no proof, our author argues, that it does not exist, since it is found, when sought for, in so great a majority of cases.)

Predisposition to consumption is better expressed as "predisposition toward pneumonia, terminating in cheesy infiltration."

The origin of consumption in catarrh is distinctly recognized; "the wide-spread doctrine that consumption is solely dependent upon a diathesis" is "gratuitous and dangerous."

He thinks it "quite possible" that the danger of pulmonary tubercle from cheesy lymphatic glands will yet furnish an indication for the extirpation of all peripheral lymphatic tumours.

This support given to the author's views by others who have studied it in other modes, and which may be called the preliminary argument, having been detailed, he enters formally upon the statement of the proofs

[1] A text-book of Practical Medicine, by Dr. Felix von Niemeyer, translated by Geo. H. Humphreys, M. D., and Chas. E. Hackley, M. D. New York: Apoleton & Co. 1869. 2 vols. 8vo.

which are to be derived from 1, pathological anatomy; 2, pathology; 3, the etiology of the disease. These are three good pillars upon which to build any medical doctrine, and we must see if he can derive any support from them. Of course we can only select, in regard to each, some of the most important points.

Support derived from Pathological Anatomy.—Under this head we shall confine ourselves to acute miliary tuberculoses. We find first the statement that all pathological anatomists agree that in an immense majority of cases there exists somewhere, most frequently in the lungs, centres of cheesy deposit; from these centres the tubercles have evidently spread, and by some it is maintained that those nearest the infecting centre can be seen to be older than those at a greater distance.

He quotes from Rokitansky, 1846, that this disease is but seldom primitive but generally secondary and dependent upon a previous deposit of tubercle elsewhere; and Rokitansky is one of those who includes the cheesy matter in the term "tubercle." He quotes to the same intent from the same author under date of 1855.

He quotes Virchow likewise. This eminent authority says, "If we examine closely enough we find almost always somewhere a cheesy nodule of ancient date," which is to be looked upon as the centre of infection. Very seldom indeed does a miliary eruption occur without a pre-existing caseous deposit.

He alludes to Buhl's cases already given, and to five carefully examined cases in Pfeufer's clinic, all of which were without exception.

In regard to acute tubercular meningitis he again quotes from Rokitansky, 1844, that it is extremely rarely a primary disease, but dependent upon disease in other parts. He finds also, in the observation of Tröltsch, that tubercular meningitis and even general miliary tuberculosis not rarely arise as secondary to purulent otitis, a strong fact in favour of his views.

The first *support derived from pathology* is the striking resemblance which exists between the course of acute tuberculosis and some of the "infectious" diseases, as typhus. "The clinical appearance of acute miliary tuberculosis is very often so similar to typhus that the differential diagnosis is impossible to the most experienced physicians."[1] In the one as in the other, there is evidence of a general blood poisoning, and the wide-spread formation of tubercles is like the eruption of an acute exanthema. This resemblance has been pointed out by clinical teachers who knew nothing of the recent experimental researches. The principal point for differential diagnosis has been heretofore the discovered presence of caseous deposits or cavities, and where none could be discovered our judgment could not advance beyond probabilities.

"Now, however, we have learned, principally through Cohnheim, an almost certainly reliable means of diagnosticating general miliary tuberculosis during life by the ophthalmic examination of the choroid."

In regard to chronic tuberculosis he finds support to his theory in the different course and symptoms which consumption presents, which are sufficiently marked to justify division into three groups, readily recognized clinically.

[1] "The symptoms [of acute tuberculosis] are so very like those of typhus that the most experienced diagnosticians acknowledge to having met with instances in which a diagnosis between the two was absolutely impossible, and when patients dying with a diagnosis of typhus really had died of tuberculosis, and conversely." —*Niemeyer's Practice.*

"Pulmonary consumption, as we have already explained, is not a simple disease—there are several forms of disease united under the term phthisis.

"The first form is the pure inflammatory, in which from beginning to end only the local processes of pneumonia, the cheesy thickening and softening of the products, are present, and true tuberculosis is entirely wanting. . . . . For this form we think the name of 'caseous pneumonia' or 'pneumophthisis simplex,' best adapted."

The second form begins, like the first, with acute or chronic inflammation and cheesy deposit, consequent upon the absorption of which tubercles appear, first in the immediate neighbourhood of the deposit and then more remote. "This form we term 'phthisis tuberculosa' or complicated phthisis."

The third form begins with miliary tubercles, secondary to pleuritic exudation, or affection of the lymphatic glands, or some other cause, and is called "tuberculosis pulmonum."

Clinically, these forms may frequently be recognized; as yet our knowledge is not sufficient to enable us to do it generally; Niemeyer alone has attempted a differential diagnosis between different forms of the disease.

We quote from the remarks on the third form a few paragraphs bearing upon the diagnosis of the complication of tuberculosis:—

"A certain criterion of the presence of miliary tubercles we do not possess. Pathology must strive to discover such a criterion, so important for diagnosis and prognosis. Whether Niemeyer's view that miliary tuberculosis manifests itself by a more continued, and pneumonic infiltration by an intermittent or remittent form of fever will be established in the future remains to be seen, so much the more since Niemeyer himself admits that his investigations are not yet closed."

"The diagnosis becomes more certain as soon as remote organs begin to be affected. If to the other symptoms obstinate diarrhœa is added, or an ulcerated laryngitis sets in, the presence of a secondary tuberculosis is in the highest degree probable."

"A want of proportion between the severe general appearances and the relative slight local signs on the part of the chest is the most important point forming a diagnosis between miliary tuberculosis and caseous pneumonia."

He devotes still more space to *the support derived from etiology*. The tendency of his doctrine is, as we have seen, to carry back, so to express it, the constitutional part of the disease from a direct connection with the production of tubercle to an indirect one. Tubercle is secondary to certain diseases to which certain subjects have a constitutional proclivity. These diseases are therefore of chief importance, and first among them stands pneumonia. Another important point is, that the mode of production shown to be most general in animals—the introduction of matters from without—cannot be so in man, and *self-infection* must be considered the chief mode in the human race. The cheesy material, whether originating in true tubercle or a product of inflammation in pneumonia, has been shown by experiment to be the most certain to produce tuberculosis in animals, and the author looks upon the presence of this matter in any organ of the human body "as the most important and the most frequent cause of tuberculosis in man." Of all the sources of cheesy matter caseous pneumonia is the most frequent, and this is the principal cause of tuberculosis.

"We have already explained that it is not a true miliary tuberculosis, but a caseous pneumonia, which is the most frequent starting-point of consumption. So long as the phthisis depends upon a caseous pneumonia alone it must be considered a local disease. . . . . As such phthisis may run its course to death or recovery without complication with tuberculosis. There may also

arise—and this appears to be the general course—a secondary tuberculosis from absorption of the cheesy detritus. This is limited, at least in the beginning, principally to the neighbourhood of the cheesy masses, or of the cavities resulting from ulceration of the same. But, sooner or later, it extends to other parts of the lungs, or attacks the pleura, intestinal canal, larynx, etc. This is the course of chronic tuberculosis or chronic tuberculous phthisis."

Not only caseous inflammation of the lungs but of other organs gives rise to tuberculosis.

"I have not seldom had opportunity in my practice to see a laryngitis ulcerosa introduce the tubercular process while the lungs did not give the slightest physical indication of pathological change."

"We might say that a recognized starting-point of tuberculosis is formed by caseo-purulent exudations upon serous membranes, as the pleura and peritoneum. It has been proved by innumerable observations that tuberculosis, after such exudations, is one of the most frequent diseases. Heretofore, the explanation of this and similar occurrences has been by the convenient and ever-ready phrase: the tuberculosis occurs by reason of the general cachexia. But why does the tuberculosis occur here and not some other cachectic disease? According to our experiments, we can now give up this explanation—made to help us out of our difficulty—and replace it with one more precise, by saying that in these cases tuberculosis is a direct result of the absorption of the cheesy pus."

But in what relation to these caseous deposits, as cause of tuberculosis, stand the lymphatic glands which have undergone this peculiar caseous degeneration.

"In this manner is answered simply and satisfactorily our former question as to the relation of scrofula and tuberculosis. There is indeed an intimate connection between the two, an actual causative union; they stand to each other as cause and effect. *Scrofula can bring about tuberculosis by absorption of the cheesy lymphatic gland substance into the blood.*"

But there are other sources of origin of tuberculosis:—

"There is further an entire series of morbid conditions which have been looked upon for centuries as the causes of phthisis, and which have been thrown overboard only by the present time in it excessive scepticism and in accordance with the dangerous maxim: that which we cannot understand does not exist."

"The ancients taught that phthisis occurred after suppression of customary secretions and discharges, whether of physiological or pathological character, after the drying up, for example, of blennorrhagias and eruptions of the skin, after rapid healing of long-standing ulcers and fistulæ, after sudden cessation of menstrual and hæmorrhoidal hemorrhages, etc. We will consider all these points further on, and try to prove that the view of the ancients was not an arbitrary one, but rested upon experience and observation, and deserves to be considered by moderns. In all the conditions given we maintain, in harmony with our theory, that by the sudden suppression or healing of these affections, in part abnormal detritus matters are absorbed into the blood, in part pathological products which for years were accustomed to be thrown off, are retained in the blood, and thereby tuberculosis is occasioned."

Hæmoptysis, too, was with the ancients one of the most frequent causes of consumption, and so continued to be considered, until Laennec changed the doctrine and made it always a consequence and never a cause of tuberculosis.

"Also in reference to this point we find ourselves compelled to reinstate the doctrine of the ancients."

"The ancients were excellent observers, and their collected experience de-

serves far higher estimation than we in later times unfortunately think good to accord to them. Unsupplied with the objective aids of physical diagnosis, they were thrown entirely upon the subjective symptoms of disease, and were therefore, in general, far more acute in searching for them than we who, relying upon the instrumental modes of investigation, treat the others as of minor importance. . . . Frequently enough have I convinced myself in practice, and could adduce the individual instances in proof, that very robust persons, in perfect health, at least without an abnormal symptom, have been suddenly attacked by hæmoptysis, and upon this had followed all the signs of phthisis. Nor did Laennec ever succeed in entirely establishing his doctrine; there were always, and even to our own times, influential opponents combating it."

That bronchitis may give rise to consumption the author firmly believes. The similarity of the early symptoms of the graver disease to simple catarrh, is good ground for the widespread and deeply-rooted general belief of this point in the minds of the people. His faith is founded upon a firmer basis, and the opposing explanation of Laennec, that the bronchitic symptoms depend upon tubercular disease, latent and not recognizable by physical examination, he terms an arbitrary assumption used as an after explanation.

He expresses himself in similar manner, but more strongly, as to laryngitis. Laennec held that the same relation existed between this disease and phthisis, as between bronchitis and phthisis, views which were opposed by Andral, yet which have held sway ever since.

"I began my observations as believing as possible, yet very soon many cases struck me, from the impossibility of harmonizing them with this dogma. For many years past, I have been convinced that this doctrine was not generally tenable. During many years I have devoted myself to diseases of the respiratory organs as a specialty, and have had abundant opportunity to see cases of commencing phthisis. Among these there have been many throat affections, in which the most minute physical examination failed to reveal even a trace of an abnormal condition of the thoracic organs. . . . In spite of the absence of lung symptoms these cases were very suspicious to me, and my prognosis was generally unfavourable. . . . Under my observation I saw not only the throat disease increase in extent and intensity, but symptoms on the part of the lungs gradually appear, dulness on percussion was perceived, and its increase followed, cough and dyspnœa followed, finally fever and death, with all the tormenting symptoms of lung and laryngeal phthisis."

To the objection that in these cases there was a latent tuberculosis, he responds: "Why should we prefer, out of respect for an hypothesis already undermined, to interpret afterwards by assumption of a latent condition of an objective something not susceptible of proof, instead of accepting as present what exact observation shows?"

That tuberculosis frequently follows suppurative inflammation of serous membranes, especially of the pleura, is claimed to be a fact accepted by all and denied by none. In the explanation the author of course differs from those who attribute it to the constitutional cachexia; with him it is a consequence of the absorption of the shrivelled pus cells and the detritus of caseous deposit. Purulent collections anywhere, especially if long pent up, thus become fruitful sources of tubercle; joint diseases, caries, and other instances are given with illustrative cases. Tröltsch is again quoted, and his testimony given as to the frequency with which tubercular meningitis follows purulent otorrhœa.

The origin of phthisis and tuberculosis from the healing of old ulcers and fistulæ, and the suppression of discharges, is "not only denied by the moderns, but laughed at as a fable." Yet some of the best names in the

profession can be brought in support of the doctrine. Morton, Sauvages, Cullen, Portal, and Schönlein, are among the number.

"With what right do *we* presume so lightly and so inconsiderately to throw aside the observations of our predecessors and the experience of centuries? Do we attribute so slight powers of observation and so little strength of judgment to such men as Hoffman, de Haen, Portal, Autenrieth, Schönlein, and a hundred others, that they were not able to avoid the 'post hoc ergo propter hoc?' Is this piece of wisdom only an acquisition of modern times?"

In this strain he maintains the credit as careful observers and reasoners, of men who showed themselves to be skilful practitioners and good logicians even without the pleximeter, stethoscope, and all the appliances of modern physical diagnosis, and holds that an empirical science like medicine cannot afford to ignore their labours. Farther to sustain his views as to this cause of tuberculosis he refers to many authors, and gives cases of his own, especially in regard to the influence of healing anal fistula.

One or two other points remain to be touched upon: The influence of constant inhalation of foreign particles, as in the well-known "dry-grinder's rot," and the consumption of mill-stone cutters, is, of course, adduced as supporting the author's theory. He refers to his work upon Inhalation for full information upon this subject.

The direct hereditary transmission of tuberculosis he denies.

"I have carefully examined almost all the young of animals experimented with, whether born early or late, and I never found in any organ a trace of tubercle or anything similar."

Virchow has said the same. He believes then tubercle is always acquired, never congenital. The inheritance is indirect; it depends upon the transmission of a disposition to those forms of disease, caseous pneumonia and scrofula, to which tubercle is secondary.

The doctrine of the contagiousness of phthisis is favoured by the author. That it is highly so he admits is not possible, but the occurrence of the disease in those who have long and closely waited on phthisical patients is too frequent and too marked to be slighted. The medium of contagion he believes to be the minute particles expelled by coughing and respiration from the lungs of the diseased which, being inhaled by the healthy, produce first irritative catarrh, and lead afterwards to tubercular disease.

The prophylaxis and therapeutics of the disease are beyond the limits of the work, as indicated by the title-page. Nevertheless, in conclusion, the author gives a brief indication of the principles which should govern us in preventing and treating the different forms of these affections. He considers prophylaxis under two heads: that of the primary diseases—scrofula, phthisis, caseo-purulent inflammations, etc.; that of tuberculosis when the primary affections already exist. In the hygienic treatment of scrofula he has nothing new to offer beyond the rules laid down by good authorities already relating to food, clothing, exercise, good air, prevention of inflammatory attacks, etc., and extending from the earliest infancy to adult age. Upon one point we quote:—

"Great care is demanded in the vaccination of children disposed to scrofula. It should be undertaken only when the children are entirely well, and only lymph should be used which is perfectly clear and free from detritus and pus and blood corpuscles."

In a former part of the work he has considered the argument against vaccination advanced by its opponents, that it transmits scrofula. He

rejects it entirely, and assents to the correctness of the general belief that the scrofulous manifestations are only excited, and not caused by the vaccination; yet he thinks there is some ground to support the argument when the dried crust is used instead of pure lymph, and therefore warns against this practice.

We may repeat what we have said of the hygiene of scrofula for consumption, and make but few additions.

"Where circumstances allow, the growing children or youths should live, or spend some portion of every year among the mountains; the purity of the mountain air is curative, while the lessened barometric pressure, as well as the exercise of ascending heights, expands the chest and makes the lungs richer in blood."

"Bronchial catarrh in persons of consumptive habit should be treated as a serious disease; even when it is insignificant the patient should be confined to his room. If pneumonia or pleurisy occur, phthisis should be kept in view as a threatening eventuality, and should influence prognosis and treatment."

If any of the primary diseases which lead to tuberculosis already exist, our endeavours must be directed to prevention of this grave complication. The author admits that in the present state of our knowledge it is impossible to say why some persons can carry about for years cheesy deposits without tubercular complication while others rapidly succumb to the graver malady from an insignificant amount of the same.

In the treatment of diseased lymphatic glands he advocates decided measures.

"Easy as it may be, as a rule, to cause the disappearance of simply tumefied glands, even so vain is every attempt to cure those which have already undergone the caseous degeneration. Here the rule, which many surgeons have long since adopted, should be general, to extirpate such cheesy glands *in toto* as soon as they are accessible to the knife without danger. They should be removed entire from among the healthy tissues, and great care should be taken not to cut or crush them, or even to continue the operation with the knife which, perhaps for the purpose of examination, has divided them; not a particle of the cheesy matter should remain in the wound!"

In view of the frequency with which phthisis follows suppurative pleuritis every attempt should be made to prevent the thickening of the exudation.

"The only means of affecting this is paracentesis, which should be resorted to much more frequently than it is, and especially when we are convinced that the exudation is purulent, or when it remains longer than usual without undergoing absorption."

"Laryngeal affections, especially the ulcerations, should be submitted to a careful local as well as general treatment, and we should not content ourselves with the false and dangerous alternative: either it is phthisis, and then all treatment is useless, or it is a local ailment which treatment by internal means will cure, or if not cured at all is of little account."

"Fistula in ano in patients of phthisical or scrofulous tendencies should never be operated on; in strong robust persons it should only be resorted to when the inconveniences of it are very considerable, when it has not been of long standing, and after laying plainly before the patient the possible danger of the procedure."

We pass on to the treatment of phthisis and tuberculosis:—

"We must first of all once more emphasize the fact that the curability of phthisis is established beyond all doubt. Until the beginning of the present century scarcely any one denied it. Laennec already—not to mention Portal—reported a series of exact observations which proved the cure of phthisis. Cicatrices in

the lungs are so common that Cruveilhier, as we have seen, declared the healing of lung cavities to be one of the commonest occurrences. Only the excessive scepticism of our century has been able to deny this curability. . . . Happily the most recent period has begun to emancipate itself from this scepticism, which indeed also has rendered extraordinary service in the advancement of our science, and whose services and justification are therefore undeniable. Whoever observes without prejudice must be convinced that recovery from phthisis is far from seldom. And if we consider the several attacks of caseous pneumonia in the course of phthisis as completed diseases the recovery appears much more frequent. We are altogether too much accustomed to look upon consumption as a continuous disease; the idea that a person may suffer more than once of phthisis is foreign to us. Generally, however, it is not a single caseous pneumonia, but a succession of pneumonias at different periods of time to which the patient succumbs, while in the intervals he is entirely or relatively well.

"Viewed in this light, consumption is one of the most curable of the dangerous chronic affections, and its treatment is often to the physician a gratifying task. Compare it for instance with the chronic brain diseases, nephritis, carcinoma, etc.; how hopeless are these in comparison with it? Truly enough, if we are to obtain a satisfactory result, the circumstances of the patient must be such as to allow not only the following out of the most comprehensive medical treatment and dietetic regulations, but also the making of considerable sacrifices, such as travelling, change of residence, etc."

The therapeutics vary according to whether the case is one of cheesy pneumonia or miliary tuberculosis. If the former, in acute or subacute stages, a mild antiphlogistic course is indicated; local depletion, febrifuges, moderate diet. If these stages are prolonged, a better diet and strengthening measures are to be ordered in spite of the fever; after their termination more decided measures, such as the milk cure and cod-liver oil. The local treatment consists of measures to favour the elimination and expectoration of the cheesy deposits. "It is the remaining caseous matter and the cavities partially filled with detritus, which, so long as they exist, not only maintain the disease, but continue the danger of tuberculosis." Inhalations are beneficial, and more so in proportion as the trachea and larynx are affected; steam or vapour is preferred to atomized fluids, and he uses most frequently solutions of alum or tannin, or sometimes tar water.

"The most important measure in the treatment of phthisis, indeed the sovereign remedy as compared with all others, is climate. If it is taken advantage of early enough, and not, as unhappily is too often the case, when it is already too late, we may expect the best results from it. I have observed, and every physician as well as myself must have observed, the most cures of chronic phthisis from climatic influences; it is true many are but temporarily benefited, but sometimes there are perfect cures. Either the patient may remove entirely to a southern clime—the choice of place depending upon the individuality of the case—or he may spend several winters at the south. In summer let him pass his time among the mountains; the light atmosphere acts as a gymnastic for the lungs, and promotes the flow of blood through them."

The therapeutics of tuberculosis is far different—so short and sorrowful a story as scarcely to allow of mention.

"It is more than questionable whether we are able to limit a commencing tuberculosis by any means at our command. If we assume what is probable, that the tuberculosis, especially when occurring in a more or less free interval of a phthisis, manifests itself by a remitting or intermitting fever, we may maintain that in many cases we can control this fever. Frequently we can treat it successfully with quinia; in other cases where quinia has failed, I have seen unexpected good result from the administration of Fowler's solution. But whether with the moderation and cessation of the fever, the tuberculosis is

checked remains open to very just doubt. No less unreliable are other medicines of reputation in 'lung tuberculosis.' We may continue to try the customary measures, whey and milk cures, and mineral waters, as well as cod-liver oil, only observe whether they are of any use against true tuberculosis! It is not very different with climatic influences, although we may be allowed to expect more from these."

Nevertheless his observations upon animals show that there is sometimes a tendency to recovery even from miliary tuberculosis, and Empis formally adopts this view.

One measure of local treatment he looks favourably upon, although he does not recommend it in strong terms; it is the use of setons and issues. They were in high favour with the ancients, and he thinks he has seen good results from them. We mention this point because it does not seem to us to accord with the author's doctrines in view of the results obtained by experiment on animals of Wilson Fox and others. If tubercle follows any prolonged suppuration in animals, why not in man? If an otorrhœa or a carious bone is likely to produce it, why not a suppurating issue? It would seem as if the dry cupping and vesicants "with which, as palliatives, we have no reason to be discontented," are better.

The object we have had in view in preparing this notice of Dr. Waldenburg's work was simply to present his views with some indication of the arguments upon which he bases them. The task has not been an easy one, from the wide range of the subject and the mass of matter to be condensed within the limits of space at our disposal. Nevertheless the attempt has been faithfully made, and if in doing so we have trespassed upon the patience of our readers, the vast importance of the subject must be our excuse. If they gain from its perusal no new principles of treatment, even if no new facts are learned, it will not be without benefit to observe the attempt at progress which earnest workers are making, and to gain an idea of the "violent fermentation" the doctrines of tubercle and consumption are at present undergoing. J. C. R.

ART. XXI.—*The Science and Art of Surgery. Being a Treatise on Surgical Injuries, Diseases, and Operations.* By JOHN ERIC ERICHSEN, Senior Surgeon to University College Hospital, and Holme Prof. of Clin. Surg. in Univ. Coll., London. From the fifth enlarged and carefully revised London edition. Illustrated with 630 engravings on wood. With additions. By John Ashhurst, Jr., A. M., M. D., Vice-Pres. of the Philadelphia Path. Soc., F. C. P. Phila. Surgeon to Episcopal Hospital, etc. etc. Royal 8vo. pp. 1228. Philadelphia: Henry C. Lea, 1869.

THE republication in this country of the fifth London edition (1868) of Mr. Erichsen's *Science and Art of Surgery*, with the valuable additions of Dr. Ashhurst, the American editor, cannot fail to be kindly received by the profession throughout our country. Occupying, as it does in Great Britain, the high position awarded in this country to the admirable *System of Surgery*, by Professor Gross, it has a peculiar claim upon our notice, as it embodies throughout not only the views of the Senior Surgeon to the University College Hospital, but those of his countrymen who have shed such lustre upon this department of the healing art. The perusal of the

work must confirm the opinions long since expressed, that Mr. Erichsen is fully competent to discuss the various topics embraced in his elaborate Treatise. Whether we regard it as a text-book for the medical student, or a guide for the practitioner, it deserves our highest praise. Every page bears the impress of the conscientious surgeon, and of the honesty of his conviction of the truth of his motto, borrowed from Lord Bacon, "That they be the best chirurgeons which being learned incline to the traditions of experience, or being empirics incline to the methods of learning." The previous editions of this work have met with the most favourable reception at home and abroad, and our author assures us in his preface, that he has spared no exertion to render the present worthy of the continued confidence of the profession, both as "a guide to the practitioner, and as a text-book for the student in surgery." He adds that the whole work has been remodelled, many of the wood-cuts re-drawn, and nearly one hundred new ones added. The chapter on Ophthalmology has been prepared by Mr. Streatfeild, while Mr. Berkeley Hill has rendered important aid in re-arranging that on Syphilis. To Mr. Alexander Bruce he expresses his obligations for the assistance rendered in the various chapters relating to General Surgical Diseases, especially those on Pyæmia, Scrofula, and Tumours. Owing to the increase in the size of the work, the London edition was published in two volumes, but by the use of a greatly enlarged page, the American edition appears in one volume, "without omission or curtailment."

Mr. Erichsen, p. 86, justly remarks, "The study of the inflammatory process is one of the most complex and difficult on which the surgeon can enter," and were anything needed to corroborate this statement, it would be only necessary to peruse the thirty-five pages devoted to the subject in the volume before us. The author has not referred to the views of Cohnheim, which threaten to supplant those of Virchow; but as Mr. E. justly remarks, p. 87, the discussion of this subject belongs rather to the domain of General Pathology than to that of Practical Surgery, and cannot be consistently entered upon here, and we proceed at once to an analysis of certain portions of the work which pertain less to the speculative, and more "to the traditions of experience."

Gunshot Wounds.—The chapter devoted to this subject remains with but little alteration, as it was to be found in the fourth London edition, 1864, and we find but two or three brief notes of the American editor. At p. 148, Mr. Erichsen, in speaking of the conditions in which amputation is required, remarks: "Indeed, it may be stated generally, that all *compound fractures of the lower third of the femur*, occasioned by gunshot, require amputation." We feel satisfied, after abundant opportunities of observing and treating gunshot fractures of the femur, that a large number of those who served through our campaign would not assent to the doctrine which has so long prevailed, and which has been inculcated by our author. We admit that if the patient has to be transported over roads nearly impassable, and by conveyances which can afford no rest to the injured limb, amputation is the better alternative; but we do believe that if the patient can remain undisturbed, and his hygienic condition be made even tolerable, he will have an equal, if not better, chance of recovery without amputation, and especially if the wound be frequently cleansed with a solution of carbolic acid, permanganate of potassa, or of common table salt, the detached fragments of bone having been removed. We have seen so many instances of fatal results following

amputation, and so many of recovery, where a treatment similar to the above has been adopted, that we have no hesitation as to the course we should pursue if called upon to engage again in military surgery, or to decide the question in civil practice. Prof. Hamilton, in his excellent Treatise on Military Surgery, 1865, p. 397, states that he has seen in the various hospitals of the United States army many hundreds, "probably thousands of broken thighs under treatment, and a certain proportion of these had already united, making tolerably useful limbs." And yet on the previous page he remarks that he believed in these injuries conservatism had ruled too much, "and that amputations had been too little practised." In the new, third edition (1866), of his Practical Treatise on Fractures and Dislocations, at p. 490, he thus gives his prognosis in gunshot fractures of the thigh :—

"The same accidents in the upper third or the shaft of the femur are generally fatal; but if the main artery and the principal nerves are uninjured, the life is, in general, less hazarded by an attempt to save the limb, than by amputation. In the middle third, under the same circumstances, the chances may be considered equal, as between amputation and the attempt to save the limb by apparatus; in the lower third the chances are in favour of amputation."

If we mistake not, the testimony of the surgeons of the Confederate army is decidedly in favour of conservative surgery; and from all that has come under our observation, in civil and military practice, and whether the operation has been primary or secondary, we have failed to discover any material difference in the rate of mortality between amputation in the middle or lower third of the thigh.

Arterial Hemorrhage.—Under this head we find Acupressure fairly presented and illustrated, with valuable annotations by the American editor. It may be that our limited experience induces us to coincide with our author in his views of this method of treatment, but it does seem to us that he is correct in the following statement :—

"Indeed, it appears to me, that sound as may be the principle on which acupressure is based, in practice it cannot and need not be substituted for the ligature, but that it may be employed advantageously in conjunction with it, each method being applied to those vessels or in those cases to which and in which it seems most useful; and that the surgeon will act more wisely in being eclectic, rather than dogmatic, in the employment of his means for arresting arterial hemorrhage, in some cases using styptics, in others compression or torsion or the cautery, acupressure or the ligature, as the particular case seems to need it. Because one method is good, the others are not necessarily bad; because one is peculiarly applicable in one case, it does not follow that it is equally so in all." (p. 190.)

Our author does not believe that the ligature is the sole, or indeed the great cause of suppuration in wounds, and of the failure of union by the first intention.

"The constitutional condition of the patient, irrespective of anything in the local management of the wound, the want of homogeneity of tissues, and the very nature of the wound itself, have also a decided influence."

In a note, p. 189, the editor adduces proof sufficient to show that it is by no means settled in what manner the closure of arteries, which have been subjected to acupressure, is effected. He quotes Dr. Hewson in favour of the closure by adhesion, Mr. Bryant, of London, of an internal coagulum, while Mr. Lee and Dr. Lionel Beale attribute it to the organization of germinal matter derived from the blood itself.

Fractures.—Some sixty-five pages are devoted to the consideration of this subject, but we must limit our notice to but two or three. At page 235, it will be seen that our author is quite partial to the use of the starched bandage, which at first he did not think was a safe practice during the early stages of fracture, and before the swelling of the limb had begun to subside.

"During many years, however, I have followed Seutin's plan in some hundreds of fractures of all kinds, putting the limb up in the starched apparatus *immediately* after the reduction of the fracture, and have found the practice an extremely successful one, even in fractures of the thigh; so much so, that at the hospital I now rarely use any other plan of treatment; and, indeed, the more experience I have of it, the more satisfied I am with the results obtainable by it. I find that the moderate pressure of the bandages, aided probably by the great evaporation which goes on during the drying of so extensive and thick a mass of wet starch, and which produces a distinct sensation of cold in the limb, takes down the extravasation most effectually, and enables the patient usually to leave his bed about the third day after the injury, when the fracture is in the leg or ankle, and about the sixth when it is the thigh that is broken; so that we now treat all patients with simple fractures of the leg, and many with fractures of the thigh, especially children, as out-patients."

He adds that from no other means of treatment has he seen such satisfactory results in cases of fractured thigh, "patients having frequently been *cured without any shortening whatever* (Italics our own), with the preservation of the natural curve of the bone, and without confinement to bed after the first week."

The same favourable opinion was expressed by the author in the previous editions of his work, and as the doctrine taught in the above extract, viz., that in fractures of the thigh cures can be frequently effected without any shortening whatever, is one which is not generally accepted in this country, we are disappointed in finding no comments of the editor upon the above statement. Especially is this to be regretted in view of the numerous and vexatious trials for malpractice, which are so frequent, at least in the western portion of the United States. Prof. Frank H. Hamilton is entitled to immortal praise for the pains which he has taken to prove that, whether the treatment by immovable apparatus be adopted, or the more common method by extension with splints and weights attached to the foot, or the inclined plane, in the great majority of cases a certain degree of shortening and perhaps deformity cannot be prevented, and the same opinion is given by Prof. Gross in his System of Surgery, vol. i. p. 961. Again, at p. 870, while he speaks in the highest terms of the starch bandage, he differs from Mr. Erichsen most decidedly in reference to its use during the first ten days after the accident, after which he thinks there are but few cases in which its application will not be beneficial.

Prof. Hamilton also in the third edition of his work on *Fractures and Dislocations*, 1866, p. 56, in admitting the great value of the "immovable apparatus," whether made of starch or other material, in properly selected cases, thus remarks:—

"Whatever its advocates may say to the contrary, the simple fact is before us, that the number of accidents resulting from this practice is out of all proportion with any other yet introduced. I have met with them myself in all parts of my own country, and the journals abound with records of disasters from this source."[1]

[1] Amer. Journ. Med. Sci., vol. xxv. p. 460, Feb. 1840; also N. S., vol. v. p. 212.

Our author disposes of the treatment of fractures of the middle of the forearm in five and a half lines, simply recommending the application of a splint somewhat broader than the arm on each side of it, and a narrow pad along the interosseous space. He directs also that no bandage should be placed under the splint. "If masses of callus happen to be thrown out across the interosseous space, the prone and supine movements of the hand will be lost, and the utility of the limb greatly interfered with."

Appended to the above brief description, we are glad to see a note from the editor, in favour of treating fractures of the forearm in the position of extreme supination as recommended by Mr. Lonsdale. We have long preferred this method, and believe that, by it, the patient is much more likely to retain unimpaired the prone and supine movements of the hand. As stated by the editor, "the position of supination by itself secures the interosseous space from encroachment;" hence there is no necessity for the narrow pad along the interosseous space, used by the author, and which is condemned by Mr. Lonsdale, Professor Hamilton, and others.

We have no space to examine, as we should like to do, our author's remarks under the head of Colles' fracture, and must pass on with the simple observation that both author and editor, in our opinion, have hardly done justice to the contributions of our countrymen upon this important subject.

At p. 282, Mr. Erichsen, in describing the various methods of treating fractures of the patella, seems to have had no personal experience in the use of the ring, the only notice of it being as follows: "Eve, of Tennessee, accomplishes the same object [holding the fragments together] by means of a ring passed around the fragments." Prof. Eve reported his success with the ring, attributing, at the same time, its introduction into practice to Dr. Gibson, of St. Louis, Mo., but as the writer has shown (*West. Journ. of Med.*, May, 1868, also *Amer. Journ. Med. Sciences*, July, 1868, p. 296), it is a very old method of treatment, having been abandoned for many years. In two cases we have thus succeeded in bringing about bony union.

Dislocations.—In the forty pages in which this subject is discussed we find many points worthy of particular study, and many which would constitute fair topics for criticism. For example, at page 291, we have the following unqualified statement: "The great obstacle to reduction is, the tonic *contraction of the muscles* inserted into or below the displaced bones." The "adjuster" invented by Dr. Jarvis is "a useful and powerful instrument for the same purpose," as the pulleys, in effecting reduction, while the method by manipulation, deservedly such a favourite in this country and with many of Mr. Erichsen's own countrymen, receives but little attention, either from author or editor.

In describing the symptoms of a luxation of the head of the femur upon the dorsum of the ilium, among others it is stated, page 317, that "when the patient is lying flat, with the knee slightly raised and advanced, the lumbar spine is on its proper level; but if an attempt be made to straighten the knee, so that the limb lies flat, the lumbar spine will arch forwards."

Now this latter test, Prof. Syme assures us (*Lond. and Edin. Monthly Journ.*, July, 1843, or *Am. Journ. Med. Sci.*, Oct. 1843, p. 461) is characteristic of luxation in the sciatic notch, and is never met with in any other injury of the hip-joint, whether dislocation, fracture, or bruise. Without attempting to explain the discrepancies between Mr. Erichsen and Prof. Syme, we may remark that, while we have had several opportunities of

determining the accuracy of this lumbar arch test, we have also satisfied ourselves that Prof. Syme is mistaken in supposing that it is characteristic of luxation into the sciatic notch. Long before the Edinburgh professor called the attention of the profession to this test, M. Jules Guerin, of Paris, had published a paper *On the Elevation and Depression of the Pelvis in Luxation of the Femur*, in the *Gazette Médicale*, No. 15, 1836. In this he maintains, 1. That in all the luxations of the femur upwards and outwards, the shortening of the luxated limb is greatly owing to the elevation of the pelvis; 2. The more complete the luxation, the greater is the elevation of the pelvis; 3. In old double or congenital luxations, the bending of the loins and the elevation of the pelvis forwards, are the consequences of the double ascent of the inferior attachment of the psoas and iliacus on the external surface of the ilium. M. Guerin goes on to show, what we have often seen, that in disease of the hip-joint, when the elevation or depression of the pelvis gives the appearance of shortening or elongation to the limb, the action of the psoas and iliacus is the cause of the phenomena.

In concluding our brief and very imperfect notice of our author's observations on dislocations, we beg to correct his statement, under the head of the accidents which have followed the attempts to reduce old luxations of the femur, page 321, that a fracture of the neck had occurred in the practice of the writer, is a mistake, or if it ever occurred, we have no recollection of the case.

Aneurisms.—None but those who have attempted the collection of the statistics of certain surgical operations, can appreciate the difficulty, and, indeed, we may say the impossibility of arriving at accurate results. The unsuccessful cases which have never been published, and the too careless manner in which cases, whether successful or unsuccessful, have frequently been reported, constitute obstacles which are truly insurmountable in our investigations of truth. Mr. Erichsen's table of cases of ligature of both carotids furnishes us with a good illustration in point. In the second London edition of his work (1857), Mr. Erichsen gave us but ten cases in which this operation had been performed, and two of these were followed by fatal results. In his fourth London edition (1864), his table includes seventeen cases, with four deaths. In the present American edition, we find a collection of twenty-seven cases, with six deaths; the number included in the table being the same as that published by Pilz, of Breslau, in the *Arch. für Klin. Chir.*, 1868. Prof. Gross, in his excellent *System of Surgery*, Philadelphia, 1864 (third edition), page 750, vol. 1, has a table of nineteen cases, with three deaths. Prof. G. has included, as did Mr. Erichsen in all of his previous editions, the case in which Langenbeck is reported to have tied both carotids on the same day, and both our authors have represented the result in Prof. Willard Parker's case as fatal. Prof. Parker's patient survived five months, and was under the writer's immediate care until his death. It can hardly admit of a doubt that he died in consequence of the extension of the malignant disease, for the arrest of which the operation was undertaken. Dr. Norris, in his most valuable paper on the ligature of the carotid arteries (*American Journal of Medical Sciences*, July, 1847, p. 13), places Langenbeck on the list of those who have ligated both primitive carotids, and yet by turning to the *Archives Générales de Médecine*, Paris, tome xix. p. 118, it will be seen that he tied the right superior thyroid, to arrest the growth of a pulsating goitre, and that in consequence of secondary hemorrhage from the seat of ligature

on the eleventh day, he tied the primitive carotid of the same side. The patient sank into a comatose state, and died thirty-four hours after the last operation. In a paper published in the *Western Lancet* (Cincinnati), September, 1855, we pointed out the above errors, and incorporated the same in a note on page 868, vol. 1, of our edition of Velpeau's *Operative Surgery*. In our table published in the *Western Lancet*, of twenty cases, there was but a single death, and that followed the operation performed by Dr. Mott with an interval of only fifteen minutes. Mr. E. has included in his table the cases of Ullman, Buenger, and the one in which Dupuytren and Robert operated at intervals of one, five, and thirty-six years. Prof. Gross, however, remarks, that "these cannot be adduced as legitimate examples of the effects of the ligation of these vessels, inasmuch as the brain had ample time to accommodate itself to the changes produced by the first operation before the performance of the second," a statement which certainly is not in accordance with the result in Dupuytren's and Robert's case, the very first in Mr. Erichsen's table, and in which the record thus reads: "Right carotid tied by Dupuytren in 1819; left by Robert for extension of disease [aneurism by anastomosis of scalp] in 1857. Delirium, hemiplegia of left side and death." Again, Professor Frank H. Hamilton reported, in the *Buffalo Medical Journal*, 1846, vol. ii. page 119, a case in which his brother, Dr. T. H. Hamilton, of Saugerties, New York, tied the right carotid, on a patient affected with epilepsy, August, 1838. The left carotid was tied in March, 1839, and notwithstanding "the ample time for the brain to accommodate itself to the changes produced by the first operation," the last was followed by palsy of the tongue, which lasted three days, and ophthalmia supervened in the left eye and destroyed it.

In Mr. Erichsen's table, we have the name of F. H. Hamilton, the distinguished professor, substituted for that of his brother, Dr. T. H. Hamilton; Reynolds (Case 20) for Rodgers (J. Kearney); and, strange to say, Mr. Longmore is accredited with the operation performed at the Confederate Hospital, in Richmond, Va., reported by Surgeon Williams, who was in charge of the division in which the patient was treated. This was communicated to the celebrated professor of military surgery at the Netley Hospital, England, by Inspector A. J. Semmes, M. D., and by Mr. L. published in the London *Lancet*, Jan. 23, 1864, p. 90. We feel satisfied that Mr. Erichsen has made another mistake in including the name of Velpeau on the list of those who have ligated both primitive carotid arteries, although at p. 644 he states that he was present at the first operation. "In a very interesting case which I saw in Velpeau's wards in 1839, both orbits were affected; and, as pressure on the right carotid arrested the pulsation and bruit in both, that artery was tied. But though the disease was cured in the left orbit by this operation, and temporarily arrested in the right, it reappeared in the latter situation, and was eventually cured here by the ligature of the left carotid." And in the table on p. 634, we find the following: "Velpeau—Age 29. Aneurism by anastomosis of both orbits. Right carotid first, Aug. 1839; left, about three months afterwards. Recovered." We avail ourselves of French testimony in reference to this case. The authors of the *Compendium de Chirurgie Pratique*, etc. (Berard, Gosselin, and Denonvilliers), vol. iii. p. 428 (*Mal. de l'Orbite*), after alluding to the singular effect produced by the compression of the right carotid on the tumour in the left orbit, and of the ligature when applied to that vessel, state that as several months

after the operation pulsation had ceased in the left orbit, and compression on the left carotid suspended the pulsations on the right side, Velpeau proposed to ligate the left primitive carotid, but to this the patient would not submit, preferring the tumour, as it gave him but little pain or inconvenience. Vidal, in his *Traité de Pathologie Externe*, etc., in 5 vols., Paris, 1855, vol. iii. pp. 356–7, gives the details of Velpeau's case, stating that the operation was performed in *July*, and by a singular coincidence, within three days of that performed by Jobert, for a tumour in the orbit. Vidal concludes his notice of the case by adding that, as the patient suffered so little from this disease, he would not submit to the second operation proposed by Velpeau, and which was strongly urged by other surgeons whom he consulted. It is added that in February, 1840, Velpeau examined the patient, and found him in the condition already mentioned. Vidal quotes from the *Dict. de Méd.*, nouv. ed., art. Orbit, Velpeau's explanation of the phenomena presented in this curious case. To Mr. Erichsen's table should be added the very successful operation by Professor Foote, of Cincinnati, which was performed for orbital aneurism, with an interval of four weeks, and the report of which was published in the *Cincinnati Lancet and Observer* for February, 1868.

At page 625 we find a brief, but sad, list of cases in which Mr. Wardrop's modification of Brasdor's method has been tried in aneurism of the innominata. The results in the four cases in this table in which the subclavian was tied, as Mr. Erichsen justly remarks, are not sufficiently favourable to justify the surgeon in repeating the attempt. No mention is made of the fatal result in our own practice, a notice of which was published in our edition of Velpeau (*op. cit.*), vol. i. p. 876. Prof. Gross has also mentioned it in his collection of these unpromising cases. Our patient died on the eighth day from hemorrhage caused by jumping out of bed. There was tubercular aneurism of the innominata and arch of the aorta, while the left carotid and subclavian were completely obliterated in consequence of atheromatous degeneration. Had our patient survived the ligature of the subclavian, we intended to ligate the carotid, in which case the patient would have been in the condition of the one reported by Rossi, of Italy, where the patient survived for six days, with a supply of blood to the head from the right vertebral, and perhaps some other branches from the subclavian on the same side. The results of ligature of the carotid on the distal principle for aneurisms at the root of this vessel have been more fortunate, and is deemed by Mr. E. a justifiable operation.

Mr. Erichsen's table of ligature of the brachio-cephalic artery includes 15 cases. He has omitted the operation accredited to Pirogoff, as well as the two reported in the name of Bujalski, as he "can find no details of these operations." Now the article on the subclavian artery in the French *Dict. de Méd.* in 30 vols., was written by Velpeau, who states that in August, 1840, M. Arendt, who had himself ligated the innominata, verbally communicated to him that Bujalski had operated in two cases, both patients surviving the operation only two or three days. On such authority we have a right to accept Bujalski's cases, making seventeen in all, with but one recovery, and that after the operation performed by Dr. Smyth, of New Orleans, in 1855. With such results Mr. E. thinks the operation "should be banished from surgical practice."

His table of cases in which the subclavian artery has been tied within the scaleni muscles, embraces 11, of which 10 died from hemorrhage, and 1 from pericarditis and pleurisy. We find that on page 647, as well as

in the table, p. 648, the name of Coles is substituted for that of Mr. Colles, of Dublin, who was, if we mistake not, the first to perform this operation within the scaleni muscles (1811). Again on page 646, we have a brief analysis of Dr. Smyth's *successful* operation, already mentioned, and, although Mr. E. states that it was performed for subclavian aneurism, on page 649 we find the following remarks:—

"Thus, it will be seen that, in every case in which an aneurism of the subclavian artery has been subjected to operation, whether by ligature of the brachio-cephalic, or of the subclavian itself *internally* to the scaleni, the result has been a fatal one. As this unfortunate termination to every case that has yet been submitted to surgical interference is in no way to be attributed to want of skill on the part of the operators—who have been, without exception, men greatly distinguished for the possession of this very quality—but is solely dependent on certain anatomical peculiarities in the arrangement of these vessels, by which their successful ligature has been rendered impossible, a repetition of these attempts, which may hasten the patient's death, can scarcely be considered justifiable."

Surely, in view of Dr. Smyth's successful operation, Mr. E. should correct his assertion that "in every case" "the result has been a fatal one." The American editor adds to the above denunciation of the operation, that "the single successful case of Dr. Smyth, of New Orleans, cannot be considered as controverting the correctness of the general rule, as stated by the author," and at page 666, in speaking of ligature of the abdominal aorta, he expresses the opinion that in a case like Sir Astley Cooper's, where the sac had actually burst externally, it would seem but right to give the patient the faint chance that the operation might offer. And, in view of, as it would seem, the necessarily disastrous results of this operation in the seven cases in which it has been tried, it is difficult to appreciate the great difference in the feelings excited in the mind of Mr. Erichsen, and the editor, as they review the history of the ligature of the innominata and the abdominal aorta. At page 665 Mr. E. remarks:—

"It is impossible not to contemplate with admiration the man whose mind was the first to conceive, and whose hand was the first to carry out, the determination to apply a ligature to the abdominal aorta; and who, guided by pathological observation and physiological experiment, dared to arrest at once the circulation through the main channel of supply to the lower half of the body, trusting to the collateral circulation for the maintenance of the vitality of the parts thus suddenly deprived of blood. Sir Astley Cooper was the first to place a ligature on the aorta, in 1817," etc.

A careful examination of the plates accompanying the report of Sir Astley's operation, in Cooper and Travers' *Surgical Essays*, Phila. ed., 1821, p. 104, together with his description of the case, inclines us strongly to the justice of Mr. Guthrie's criticism of this operation. At page 256 of his *Commentaries*, etc., 6th Am. ed., he remarks that, in his opinion, it will not be necessary to perform it, for when an aneurism has formed so high up that it prevents the application of a ligature on the side on which the disease is situated, the common iliac can be readily reached on the sound side of the body, very little more knowledge and dexterity, he adds, being required to pass over to the opposite or diseased side, and to ligate the artery above the aneurismal tumour, etc. "The placing a ligature on the aorta for an aneurism in the pelvis will thus be rendered unnecessary—a most important result, deduced from the operation described."

As in Sir Astley's case, the aneurismal sac extended to, but did not involve the common iliac, we cannot subscribe to the statement of the

American editor that, in similar cases, a similar operation would be justifiable—Mr. Guthrie's method, in our opinion, holding out far better prospect of recovery. And preferable to either is the proceeding successfully adopted by Prof. Syme, in a case in which the tumour reached even to the bifurcation of the common iliac. Instead of resorting to "the desperate expedient" of tying the aorta, he opened the sac, and ligated the common internal and external iliac arteries, the hemorrhage having been completely suppressed by Prof. Lister's clamp over the aorta.[1] In Sir Astley's case, two students succeeded in compressing, with their hands, the aorta upon the spine, so as to arrest the pulsation in the right groin, and there can be but little doubt that, with the modern improvements in compressing the aorta, the circulation could be so controlled in a case like that of Sir Astley Cooper's, that the sac could be opened, and ligatures be applied above and below the opening communicating with it. The report of Murray's case, however, shows that it is not always an easy matter to ligate the common iliac from the opposite side.

At p. 616, Mr. Erichsen expresses his opinion on the treatment of femoral and popliteal aneurism by compression.

"After carefully considering the relative merits of the two plans of treatment, I think we may conclude that, though in some few cases neither ligature nor compression can be adopted, and amputation is the sole resource, yet in others compression can be employed when it would not be safe to have recourse to the use of the ligature; and that, in all ordinary cases of femoral and popliteal aneurism especially, compression should be preferred to the ligature, inasmuch as it is not a more tedious, and an infinitely safer, method of cure. At the same time, it must not be forgotten that its success depends very greatly on the continuous care bestowed upon the case during the progress of the treatment."

As to the tediousness of this method, therefore, Mr. E. is decidedly at variance with Prof. Syme, in his *Contributions to the Pathology and Practice of Surgery*, ed. 1848. After computing the average duration in 23 cases, "not of the treatment but of the actual compression, excluding the intervals of its discontinuance," at thirty-eight days, he thus exclaims: "Thirty-eight days and nights of misery to escape a few minutes of trivial uneasiness." Now, of 36 cases cured by compression in the London hospitals, Mr. E. states, p. 615, that, according to Mr. Hutchinson, the average time was only nineteen days; and as to the amount of "misery" endured by the patient, much will depend upon the "continuous care bestowed upon the patient." Indeed, by the combination of treatment employed at the present time, and which has been successful in our hands in several cases, the duration of the treatment is abridged, so that in many instances it has been successful in the course of a single hour, or in a few hours. We speak of the treatment by manipulation, flexion, or compression on the distal side, while digital compression is maintained between the tumour and the heart.

The American editor reported in the *Amer. Journ. of Med. Sciences*, January, 1868, p. 44, a case in which he ligated the femoral artery for an incipient aneurism of the right popliteal artery, the patient dying on the forty-fourth day of pyæmia. In commenting on this case, he remarks that the fatal result should not be charged to the operation, as the first bad symptom was not manifested until twelve days after the separation of the ligature, "when the patient was, *quoad* the operation, entirely out

[1] *Vide* Med.-Chir. Trans., London, vol. xlv.

of danger." In the account of the autopsy, it is stated that the "femoral vein contained a clot, unaltered above but softened below into a fluid of puriform appearance. The walls of the vein were perfectly healthy." We are told that the femoral artery was of unusual size, and that the popliteal portion of the vessel was dilated, "furnishing a good example of the very first stage in the formation of fusiform aneurism." Now we confess that, had the case occurred in our own practice, judging from the complete report, we should have felt a regret that we had not tried the treatment by flexion and digital compression, alternated perhaps with that kept up by instruments. We have, at the present time, a case of popliteal aneurism perfectly consolidated, in which the above treatment was continued for a month, with very little disturbance of the patient's comfort. We have reason to believe that, in our case, the disease was tubular aneurism, similar to that represented on p. 612, of Mr. Erichsen's work, and that the greater length of time required for its cure was due to the fact that it was accomplished only by the contraction of the sac, as well as by the irregular deposit of fibrine. In concluding his notice of the above fatal case, as well as one in his practice which had been successful after the ligature, the American editor expresses the opinion, with Prof. Syme, that the ligature should be employed in preference to any other means of treatment, as "deligation of the femoral artery in cases of aneurism, if performed sufficiently early, is a much less dangerous operation than has been generally supposed."

In the text, p. 670, Mr. Erichsen alludes to the statistics of Norris, that the mortality after ligature of the femoral is one in four, and to the still greater mortality following the same operation, in the London hospitals, it being, as shown by Mr. Hutchinson, at the rate of ten deaths in thirty-three cases. The dangers of the operation are well presented by Mr. Erichsen, and, we believe, are now fully appreciated by the profession, notwithstanding the extraordinary success which has been attained by the late Dr. Mott, Dr. J. Kearney Rodgers, Mr. Busk, of the Dreadnought Hospital, London, and by Prof. Syme. We do not believe, in view of the above facts, and of the brilliant results which have crowned the method of compression, that the majority of surgeons will concur in the following note of the editor, p. 616:—

"Ligation of the femoral artery, though not a difficult, is a very delicate, operation. If, however, it be done with due care, *when the aneurism is of moderate size*, it is, I believe, a much more successful operation than it is usually considered. For well-selected cases I cannot help thinking, with Mr. Syme, that it is the best mode of treatment."

The more correct doctrine has been laid down by Mr. Erichsen, p. 616, viz., that in all ordinary cases of femoral, and popliteal aneurism especially, "compression should be preferred to the ligature, inasmuch as it is not a more tedious, and an *infinitely safer* (Italics our own) method of cure." In this, we doubt not, the larger number of surgeons both in this country and Great Britain coincide, and the following extract from the *Rapport sur les Progrès de la Chirurgie*, made by MM. Denonvilliers, Nélaton, Velpeau, Felix Guyon, and Leon Labbé, and published under the auspices of the Minister of Public Instruction, Paris, 1867, shows that the above is now the accepted doctrine even in France. The writer, after referring to the labours of Malgaigne, MM. Broca (1856), Richet (1865), and Lefort (1864–1866), remarks that, during the past fifteen years, French surgery has materially changed its views in reference to the treat-

ment of aneurisms. Not that it has discarded the operation by ligature, but as this operation is liable to be followed by accidents of the most serious nature, it is reserved for grave and complicated cases; in a word, it should be the last and supreme resource. "So to speak, it has acquired a new responsibility; indeed, the circle of its application has been materially narrowed by ordinary cases; whereas, in those of a graver character and in which other methods have failed, it is the only remedy." (p. 551.)

The French reporter alludes to the fact that those who have published since M. Broca, have demonstrated the greater safety of the mode of treatment by compression, and that the duration of treatment is decidedly less than that required by the ligature. And to show in what favour compression has been received in France, he adds that, of sixty or seventy cases collected by M. Richet between the years 1856 and 1864, thirty-seven belong to French surgery. (p. 552.)

We regret that neither Mr. Erichsen nor the American editor has appended the views of Professor Syme as expressed in his address before the British Medical Association, at Leamington, August 3d, 1865, and which may be found in the *London Lancet*, Aug. 12th, of the same year, p. 176. We omit his remarks in reference to the ligature, which, in his hands, he regards as absolutely free from danger—thirty-five operations and all successful—and confine our quotation to what he seems forced to admit concerning the treatment by compression, for the revival and improvement of which, he adds, we are indebted to our Dublin brethren.

"There can be no doubt that by means of properly constructed apparatus, and with sufficient endurance on the part of the patient, aneurisms, and more particularly those of the femoral artery, may usually thus be remedied without any long delay. . . . . The method by pressure therefore, while justly regarded as a valuable addition to the resources of surgery, should hardly be considered as a substitute completely superseding the operation."

A valuable addition to the resources of surgery! and aneurisms of the femoral artery may thus be remedied without any long delay! How great the change in the Professor's views since 1848. In his Contributions, &c., already quoted, he thus expressed his opinions:—

"The question between ligature and compression seems very much the same as that between passing a catheter, and puncturing the bladder for retention of urine. If the surgeon can with safety relieve his patient by means of the catheter, he should certainly do it. But if, instead of drawing off the water, he can only lacerate the urethra, and make false passages through it, his duty is plainly to thrust a trocar into the bladder. If it is in his power to afford relief by the catheter, he is bound to do so; and on the same principle, so long as it is my sincere persuasion that ligature of the artery is preferable to pressure for the cure of popliteal aneurism, I shall deem it my duty to pursue this method, though it may not, perhaps, be the best adapted for the lowest capacity of surgical practice. Puncture of the bladder, and compression of the femoral artery may be useful expedients when circumstances forbid the adoption of better means. . . . But it would surely be unreasonable to insist upon these clumsy, painful, and, I will add, dangerous methods of treatment being employed on all occasions, instead of those which, when properly executed, are easy, gentle, and safe."

Surely the Edinburgh professor must have gone to Leamington *via* "the sainted isle," and shared the fate of his illustrious compatriot, Prof. Pirrie, of Aberdeen, who went to Dublin in Oct. 1859, for no other purpose, as he declares (*Principles and Practice of Surgery*, 2d ed., Lond., 1860, p. 529), than to satisfy himself, by personal observation, of the

advantage of the "bloodless cure of aneurism." The result of his visit was the firm belief that the treatment by compression is a safe, simple, successful, and almost painless mode of curing aneurism. His interviews with his "Dublin brethren" satisfied him that in operative surgery, whatever "men dare, they can do," and he returned to "dear auld Scotland," cherishing the highest admiration of the talents and skill of the Irish surgeons. So marvellous a change in the views of the Edinburgh professor in the treatment of popliteal aneurism can be accounted for only on the supposition that in some way he has caught the "yippidemic"[1] from his "Dublin brethren."

Syphilis.—The author in his preface acknowledges his obligations to his colleague, Mr. Berkeley Hill, for much valuable assistance in re-arranging the chapter on syphilis. At p. 519 we find, under the head of Constitutional Treatment, the following: "The *simple, soft, or excoriated chancre* will readily heal under the non-mercurial treatment; but, contrary to the opinion of many surgeons of the present day, I consider it much safer to put the patient upon a mild course of iodide of mercury." This shows plainly that our author has not the fullest confidence in the modern notions that the indurated chancre is the only infecting sore, and that after these sores have readily disappeared, the patient's "safety" from constitutional infection is assured. In this he accords with Prof. Gross (*op. cit.*, vol. i. pp. 285–6) and, indeed, with many others. In a review of recent works on syphilis, in the *British Foreign Med.-Chir. Rev.*, July, 1869, the writer has, in our opinion, well expressed the truth.

"Most observers are tolerably well agreed that there are two distinct kinds of sores, but it may probably be a matter of dispute for some time what are the essential and typical characteristics of each. Hitherto induration of the base of the sore has been held to be the distinguishing mark between the infecting and the non-infecting sore. But there is good reason to think that infecting sores are not always indurated; and, if this should be proved to be the case, we must find some other characteristic which shall be taken as typical—we must find some other mark which shall serve to show whether the primary disease will or will not be followed by secondary symptoms. At present we have no such diagnostic sign."

Still we are informed by the same writer at the commencement of his review, that there is perhaps no subject, within the range of medical and surgical practice, which has made more satisfactory progress during the last half century than that of the venereal diseases, and yet from the above quotations in reference to the infecting and non-infecting sores, we are even now compelled to accept the statement made by Mr. Lane nearly thirty years ago, in his lectures published in the *Lancet* for 1841–2, vol. ii. p. 594. We quote in point his graphic description:—

"The practical inference I wish you to draw from these remarks is, that a mere pimple, an excoriation, a vesicle, a pustule, a minute ulcer, one covered with a scab or not, a superficial ulcer, a raised ulcer, a deep one, one with or without induration, a spreading ulcer, phagedenic or sloughing, a stationary one, a cicatrizing ulcer, ulcers varying in form, in colour, size, or number, may contain, or have contained, the syphilitic virus, and, consequently, may be followed by the secondary or constitutional disease."

Mr. Erichsen, as we have seen, employs mercury in the treatment of simple chancre, and at page 529 he expresses himself in terms not to be mistaken, as to the great value of this agent, both as a prophylactic, and as

[1] *Vide* Noctes Ambrosianæ, New York, 1857, vol. iii. p. 147.

a curative means, "an antagonistic to the syphilitic poison," when the disease has passed beyond the so-called primary symptoms. Nothing can be more unlike than the therapeutic views taught by our author, and by Prof. Gross, and as the work of Mr. E. will be widely circulated as a text-book in our schools, we are glad to find a brief protest from the editor, who, at page 519, remarks :—

"The experience of American surgeons is decidedly in favour of treating the soft chancre or simple sore by local measures only, or if constitutional remedies be administered, such only as are indicated by the patient's general condition."

And again, at page 530, he adds :—

"Most modern syphilographers, whether unitists or dualists, acknowledge that the natural evolution of syphilis cannot be prevented by the use of mercury; and hence the administration of this drug for primary symptoms is now comparatively seldom resorted to. (See, upon this point, Cullerier's *Atlas of Venereal Diseases* edited by Bumstead, and review in the *American Journal of the Medical Sciences*, Jan. 1869, pp. 123–4.)"

We regret that our limited space will not allow us to notice the doctrines taught in reference to the transmissibility of secondary symptoms. We can only state, that they accord in the main with those inculcated by Vidal in his *Treatise on Venereal Diseases*,[1] and which was translated by the writer, who, in numerous notes, sought to incorporate additional evidence in favour of the transmissibility of secondary symptoms, as taught by the distinguished French author, and in opposition to the "immutable *laws*" laid down by M. Ricord. These "immutable *laws*" have yielded to the "irresistible logic of facts," and few indeed are found to defend them. With their illustrious master, we may now truly exclaim, "*Avec le temps la science à fait un pas*," and if any still entertain a doubt that the *annihilation* of many of these "immutable laws" has been a boon to society, let him carefully peruse an elaborate paper on "Prostitution in Relation to the National Health," *Westminster Review*, London, July, 1849, p. 82. (*Report from the Select Committee of the House of Lords on the Contagious Diseases Act*, 1866; *together with the Proceedings of the Committee, Minutes of Evidence, and Appendix, Session* 1867–8.)

Diseases of Bone.—To the brief but excellent remarks of the author on suppuration of bone, including osteo-myelitis, we find in reference to the latter an interesting and valuable note from the editor; we cannot, however, but express surprise that he has omitted to notice the elaborate article by Dr. Lidell, in the *New York Medical Journal*, March, 1867.

Excision of Joints and Bones.—To us this is one of the most interesting chapters in the whole work. The indications for excision and the conditions of success are distinctly laid down, and the best methods of operating well described. In enumerating, however, the indications for excising the shoulder-joint, such as disease and compound and comminuted fracture of the articulation, he forgets to mention the brilliant operations for bony tumours of Prof. Syme, and the late Dr. H. N. Bennett, as reported in this Journal, Oct. 1863, p. 385. In a letter received by the writer from the latter not long before his death, it was stated that at the time of writing (Oct. 1866), nearly five years after the exsection, the patient had almost a perfect use of his limb. We have had an interesting case of this kind in our own practice, as well as an exsection for compound luxation of the

[1] New York, 1854.

head of the humerus, which our author has forgotten to note as one of the causes which may lead to the operation.

Excision of the Scapula.—Mr. E. remarks that "the American surgeons have distinguished themselves highly in this department of surgery." He erroneously gives to Prof. Syme the credit of having first removed (1856) the scapula, leaving the arm untouched. The operation of Langenbeck was prior to this, in 1855.

The editor has made a brief notice of Dr. Stephen Rogers' paper published in this Journal, Oct. 1868. Dr. R. had collected fifty-six cases of excision of the whole, or greater part of the scapula, with the most gratifying results. The writer has had in his own practice three of these operations, two for caries and necrosis, and one for gunshot fracture, the patient recovering with an excellent use of the arm.

Excision of the os calcis should not, in the opinion of our author, be lightly undertaken. He has never excised it but once, having found in the eighteen or twenty cases which have come under his care that he could readily scoop out the whole of the carious bone, "leaving little more than an osseous shell." This has left the foot as useful as ever for all purposes of support and progression. The writer has adopted this practice in several cases with the happiest results.

The remarks of both author and editor on excision of the head of the thigh-bone are replete with interest and instruction. The author justly observes (p. 780) that the operation is sometimes required to prevent the almost inevitable loss of life of the patient by continuance of hectic, and he believes that we should under such circumstances not be deterred from performing it, from the fear that we may not be able to preserve so useful a limb, as we do after exsections of the head of the humerus or elbow-joint. It is a question of life, and not of the perfection of the limb. The editor shows, from the extensive statistics he has collected, that in properly selected cases the chances of success are quite as good as after most capital operations—of 242 cases, 109 recoveries; and in 76 cases a useful limb was obtained. In the *Rapport sur les Progrès de la Chirurgie*, from which we have already quoted, made under the auspices of the Minister of Public Instruction in Paris, 1867, we find at page 633, the reporters, MM. Denonvilliers, Nélaton, Velpeau, Félix Guyon, and Leon Labbé, asserting that it is incontestable that excision of the knee and hip have for a long time been abandoned in France, and that they could cite only that of excision of the hip, performed by Roux in 1847. The writer witnessed this first operation in France, and the child, exceedingly emaciated at the time, sank exhausted within a few days after the operation. The reporters add very gravely that French surgeons probably attach too much importance to the contra-indications; that possibly they place too much reliance upon their skill in treating diseases of the joints; but they ask, Do not foreign surgeons unwarrantably multiply the indications for resections? That was the opinion expressed in the Academy of Medicine in 1861, by Velpeau, Malgaigne, M. Gosselin, etc. They then add: "Foreign surgeons themselves deny the advantage of resections. Syme, of Edinburgh, says M. Sédillot, maintains, with the sanction of many of his countrymen, that resection of the hip has never cured a single patient affected with coxo-femoral caries, and that the cases reported cured have recovered in spite of the operation, which contributed but to aggravate the condition of those who submitted to it." And yet we are told in Sédillot's *Contributions à la Chirurgie*, Paris, 1866 (*vid.* notice in *Brit. and For. Med.-Chir. Rev.*,

July, 1869, p. 94), that Sédillot now expresses himself in favour of this operation, and that he relates a successful case in his own practice. Maisonneuve, according to Dr. Suckley (*New York Journ. of Med.*, May, 1858, p. 353), had performed this operation in December, 1857. Dr. S. adds that the patient was a young woman suffering from morbus coxarius, and that in two months after the operation she was doing well, although much reduced by suppuration and long confinement. It seems strange that the above reporters should have overlooked this case. A case is also reported by Verneuil in the *Gazette des Hôpitaux*, No. 133, in which, in a similar case to that of Maisonneuve, the operation proved fatal on the fourth day.

But we must now bring our imperfect notice of the volume before us to a close. We do it with reluctance, as so much of interest and practical value remains; as, for example, in the chapter on ophthalmology, written by Mr. Streatfeild; that on diseases of the jaws and their appendages; on plastic surgery of the face; the treatment of harelip and uranoplasty, laryngotomy and tracheotomy; diseases of the breast; hernia; diseases of the rectum; lithotomy; diseases of the testis; ovariotomy, etc. etc. We have ventured to expose what we believe to be omissions and inaccuracies, and to criticize certain opinions, both of author and editor. But the great value of Mr. Erichsen's *Science and Art of Surgery* has been too long established to require praise at our feeble hands, and the annotations of Dr. Ashhurst, brief from necessity, on account of its already great size, nevertheless add to the completeness and excellence of the work. To the publisher much praise is due for the creditable manner in which he has issued this standard treatise. G. C. B.

ART. XXII.—*The Mechanism of Dislocation and Fracture of the Hip; with the Reduction of the Dislocations by the Flexion Methods.* By HENRY J. BIGELOW, M.D., Professor of Surgery and Clinical Surgery in the Medical School of Harvard University, Surgeon of the Massachusetts General Hospital, etc. etc. With illustrations. Royal 8vo. pp. 150. Philadelphia: Henry C. Lea, 1869.

DR. BIGELOW has devoted special attention to the surgery of the hip-joint for more than eight years, having read his first paper on the subject before the Boston Society for Medical Improvement in the month of June, 1861. He has since discussed the matter before the Massachusetts State Medical Society (in 1864), and before the American Medical Association (in 1865). In the present very handsome volume (which he still modestly calls a "paper"), he has systematically arranged the results of his eight years' study, adding references to cases reported by other writers, and embellishing his pages with fifty-two excellent wood-cuts, many of which are original.

The mechanism of dislocations of the hip has always been a puzzle to students, and we may add to practitioners also; and though of late years we have come to recognize, empirically, that these dislocations may be reduced by much gentler methods than were adopted by our predecessors; yet it is probable that no two surgeons could be found who would agree in every particular as to the mode in which their manipulations were ef-

fective. The chief point of dispute has always been, and still is, as to the relative share taken by the muscular and ligamentous structures of the joint, respectively, in producing and maintaining the luxation, and in assisting or impeding its reduction.

The advocates of the doctrine which affirms the efficiency of the muscles justly observe that, if these did not by their contraction maintain displacement, it ought to be as easy to reduce a dislocation without anæsthesia as with its aid; and in fact, in cases of young children (whose muscular resistance is feeble), anæsthesia is not essential; but, on the other hand, it may with equal justice be retorted, that, were the muscular structures alone effective in keeping up a dislocation, the use of ether or chloroform should abolish all resistance, and the surgeon ought then to be able to slip the head of the bone in or out of the socket at will—a possibility which every-day experience disproves.

Hence the true state of the case is, we think (and this our author seems to acknowledge), that while the ligaments of the joint are chiefly concerned in the mechanism of dislocation, the surrounding muscles add greatly to the difficulty of reduction, not only by their contraction, under the influence of the patient's will, and by their tonic contraction or passive force, but by an absolute spasmodic contraction to which they are excited by a reflex process, which is in no degree under the control of the patient, and which, in the case of a vigorous adult, can best be done away with by inducing profound anæsthesia.

The muscular impediments can therefore be removed by using ether or chloroform; the ligamentous obstruction to reduction can only be removed either by violent stretching or tearing, as was not unusual in the days of pulleys and Jarvis's adjuster, or by eluding the resistance by manipulation judiciously applied, relaxing the tense fibrous bands, and gently, and on simple mechanical principles, restoring the displaced bone to its proper situation.

To understand, then, how to effect reduction by manipulation, it is necessary to comprehend the nature of the ligamentous obstructions, and how they are to be overcome. This matter has been closely investigated by Dr. Bigelow, his attention having been, in the first place, directed to it almost accidentally (p. 10), and we must in candor say that his explanation appears to us more simple and more reasonable than any which has hitherto appeared. The whole mechanism of dislocations of the hip, and of their reduction, is dependent on the condition of the anterior part of the articular capsule, which is, in this situation, thickened into a fibrous band commonly described as the ilio-femoral ligament.

"This ligament is more or less adherent to the acetabular prominence and to the neck of the femur; but it will be found, upon examination, to take its origin from the anterior-inferior spinous process of the ilium, passing downward to the front of the femur, to be inserted fan-shaped into nearly the whole of the oblique spiral line which connects the two trochanters in front—being about half an inch wide at its upper or iliac origin, and but little less than two inches and a half wide at its fan-like femoral insertion. Here it is bifurcated, having two principal fasciculi, one being inserted into the upper extremity of the anterior intertrochanteric line, and the other into the lower part of the same line, about half an inch in front of the small trochanter. The ligament thus resembles an inverted Y, which suggests a short and convenient name for it."

In the large majority of hip dislocations, both branches of this "Y ligament" remain intact; in a few the outer branch is broken, the inner

remaining; while in others, which are properly called Irregular Dislocations, both branches are broken. Dr. Bigelow justly, we think, rejects the name of dislocation "into the ischiatic notch," and gives to this, which is a mere variety of that on the dorsum ilii, the more accurate title of "dorsal dislocation below the tendon;" the tendon in question being that of the obturator internus muscle, behind or below which (with a part of the capsule), the head of the bone is in these cases confined. Dr. Bigelow gives the following classification of dislocations of the hip, which is anatomically correct; though for practical purposes, it seems to us, his first two and last three regular dislocations might be considered in either case as forming but one variety.

"I. The REGULAR DISLOCATIONS, in which one or both branches of the Y ligament remain unbroken.

1. Dorsal.
2. Dorsal below the tendon (*ischiatic notch of Cooper.*)
3. Thyroid and downward.
   Obliquely inward on the thyroid foramen, or as far as the perineum.
   Vertically downward.
   Obliquely outward as far as the tuberosity.
4. Pubic and sub-spinous.
5. Anterior oblique.

Both branches entire.

6. Supra-spinous.
7. Everted dorsal.

External branch broken.

II. The IRREGULAR DISLOCATIONS, in which the Y ligament is wholly ruptured, and whose characteristic signs are therefore uncertain."

We would gladly follow Dr. Bigelow in his able exposition of the exact mechanism of each of these varieties of dislocation, the manipulation required for reducing each of which becomes obvious, as soon as that mechanism is clearly understood. To do this satisfactorily would, however, require more space than our limits will allow, and, besides, a mere verbal description, without the assistance of the illustrative wood-cuts, could hardly convey a fair idea of Dr. Bigelow's reasoning. Suffice it to say that, in the dorsal dislocations, the outer branch of the Y ligament is the one principally concerned; while in all the rest, it is the condition of the inner branch that determines the surgeon's motions in effecting reduction. With regard to reduction, it is evident, from a consideration of the anatomical relations of the part concerned, that extension in the line of the axis of the trunk can only act by violence, stretching or tearing the Y ligament, and that hence the first step in all the processes of manipulation must be to *relax* the ligament by *flexing* the thigh on the pelvis. The leg is flexed on the thigh, simply as a matter of convenience and to gain leverage. Having relaxed the Y ligament, the dislocation may often be reduced by *jerking* the head of the bone into its socket, by direct *traction* in a direction vertically upwards (the patient's trunk being recumbent), by the *gentle shaking* recommended by Hippocrates (p. 28), or by the rotation and circumduction methods, which must be varied according to the nature of the particular luxation. In the backward dislocations, having relaxed the Y ligament by flexing the thigh on the pelvis, the limb being somewhat inverted (a movement which, in the dislocations behind the tendon, likewise dislodges the head of the bone from its abnormal seat), the surgeon employs abduction and rotation outwards (as directed by Drs. Nathan Smith and Reid), and thus fixes the great trochanter against the outer branch of the Y ligament, causing the latter to

roll around the neck of the bone, and thus to serve as a kind of sliding fulcrum by which to pry the head of the bone into its socket.

In the thyroid dislocation the proceeding is reversed—the *inner* branch of the Y ligament, with the obturator muscle, being made to wind around the neck of the femur by *ad*duction and *inward* rotation. If in any case difficulty is met with from the smallness of the capsular orifice, it can readily be enlarged by abduction or circumduction outwards, in the case of the backward dislocations, or by adduction or circumduction inwards, in the case of those in a forward direction.

"To reduce the other varieties of downward luxation, the femur should be flexed and its head drawn and guided towards the socket, during which manœuvre these dislocations are sometimes converted into that upon the thyroid foramen, or upon the dorsum below the tendon."

Reduction of the pubic dislocation by rotation "is to be accomplished by much the same method as in the thyroid dislocation, except that in the pubic luxation the flexed limb should be carried across the sound thigh at a higher point."

The three remaining regular dislocations may be reduced by first converting them into the ordinary dorsal variety, and then proceeding as for an original dorsal luxation.

We have thus endeavoured to indicate as briefly as possible the *principle* upon which reduction by manipulation is to be effected; for the details of treatment and the modifications suited to each variety, we must refer the reader to Dr. Bigelow's pages. We will merely add that, in flexing the thigh so as to relax the Y ligament, if it be too much flexed, the relaxation will be excessive, and the ligament will not serve as a fulcrum on which to exercise the necessary leverage; while, if the capsular laceration be very large, if the limb be too much abducted, the dorsal may be converted into a thyroid dislocation, or *vice versâ*, in the attempt to rock the head of the bone into the acetabulum. This risk can be avoided by limiting the degree of abduction, and *lifting* the limb during the manipulation.

Under the heading of "Special Conditions of Dislocation," Dr. Bigelow discusses, successively, old dislocations and their reduction, dislocation from hip-disease, dislocation of the hip with fracture of the shaft of the femur, and spontaneous dislocation. With regard to the treatment of old dislocations, Dr. Bigelow's experience confirms our own, that there is not so much difficulty in *effecting* as in *maintaining* reduction, on account of secondary changes in the head of the bone and the acetabulum. In such a case, Dr. Bigelow recommends that the limb should be fixed in the position in which reduction was effected, until the cotyloid cavity becomes again excavated by absorption. For effecting reduction in old dislocations, or in cases of dislocation complicated with fracture, an ingenious apparatus is described and figured, by which *angular extension* may be made.

"Although the need of this apparatus may be rare," says Dr. Bigelow, "it will prove occasionally efficient in reducing a luxation of long standing or complicated with fracture. At any rate, I cannot believe that the period is remote when longitudinal extension by pulleys to reduce a recent hip luxation will be unheard of."

Dr. Bigelow gives an account of three cases in which patients possessed the power of luxating and reducing the head of the thigh-bone by muscular action. In all of these the direction of the dislocation was dorsal. We have ourselves met with one case in which the patient possessed the power of spontaneously producing a thyroid dislocation. In this instance

the patient was a female and epileptic. She had been an inmate of both the Pennsylvania and the Philadelphia Hospitals, and was in the habit of dislocating her thigh in public places in order to excite sympathy.

The second portion of Dr. Bigelow's volume is devoted to Fractures of the Neck of the Femur, which the author proposes to divide simply into "1st. The impacted fracture of the neck into the trochanter; 2d. Other fractures of the neck." As he very justly remarks, the application of the terms *intra-capsular* and *extra-capsular* has not much practical value, as even after death it is often impossible to say whether a certain fracture has been within or without the capsular ligament; while during life the distinction is still more difficult, for the reason that the attachments of the capsule vary greatly in different subjects. Moreover, the treatment is precisely the same for both intra- and extra-capsular lesions. The signs of the impacted fracture are pain and tenderness, slight shortening (usually about half an inch), eversion, or rather, impossibility of inversion, with rotation of the trochanter in an arc around the head of the bone, and an absence of crepitus. To these we would add flattening of the trochanter, which, though very slight, can, we believe, be usually detected by careful inspection. The anatomical structure of the neck of the femur, which is well described by Dr. Bigelow, explains the occurrence of eversion and shortening as the almost necessary accompaniment of impaction; in some rare cases, however, where the comminution of the shaft is greater, there is positive inversion. The treatment of impacted fracture does not require extension, but in other respects is the same as that for unimpacted fracture of the same part.

The concluding pages are devoted to fractures of the pelvis. Dr. Bigelow justly remarks that the diagnosis of fractured acetabulum is unwarranted in cases where there is no crepitus. Mere inability to keep the head of the bone in place, after reduction of a dislocation, is more likely to be due to other causes, and can commonly be remedied by fixing the limb in the position of angular extension, or in that particular posture in which the reduction was finally accomplished.

A sufficiently full Index terminates Dr. Bigelow's handsome book, of the main features of which we have endeavoured to give our readers a condensed abstract. It is a very useful book, and, we believe, sound and thoroughly practical. We doubt not that it will add to its author's already high reputation as both a thinking and a working surgeon. There are one or two slight literary blemishes which should have been corrected by the proof-reader: thus, in the summary on page 27, which we have quoted, the sentence "The irregular dislocations . . . whose characteristic signs, etc.," is manifestly ungrammatical, and should read "the characteristic signs of which." Again, the word "perpendicular" is several times used, where "vertical" would explain more exactly what is meant. These things are indeed scarcely worth mentioning, and would not attract attention but for the great scientific excellence and general literary and artistic beauty of the book. The paper and press-work (executed at the Cambridge University Press) are all that could be desired, while the wood-cuts are really very finished productions.

J. A., JR.

ANALYTICAL AND BIBLIOGRAPHICAL NOTICES.

ART. XXIII.—*Saint Bartholomew's Hospital Reports.* Edited by Dr. ANDREW and Mr. CALLENDER. Vol. V., 8vo. pp. xxiv., 287. London: Longmans, Green & Co., 1869.

ON the principle of being twice indebted to the giver who is prompt in his benefactions, we ought to feel doubly obliged to the staff of St. Bartholomew's Hospital for the commendable and, we may add, customary punctuality with which their annual volume of reports is issued. The series has now completed its first *lustre*, and, we are glad to say, shows no indication of decrepitude or premature senescence, but appears as full of vigour and of future promise as at its beginning. The present volume (which we consider on the whole superior to its last year's predecessor) contains twenty scientific communications, and is adorned with six excellent lithographic plates. As has been lately our custom in dealing with the various hospital reports, we shall now proceed to notice its contents, grouping together those papers which seem of special *surgical* interest, and those again which more directly refer to practical *medicine*.

We shall first invite our readers' attention to Article I., "*The Anatomy of Brain Shocks—Part II.*," by GEORGE W. CALLENDER. The first portion of Mr. Callender's paper appeared in Volume III. of the Reports, and was noticed in the number of this Journal for July, 1868, p. 225. It contained 48 cases, to which are now added 51 more, making a total of 99. As lovers of medical statistics, we cannot help wishing that there was one more; it would have so much facilitated the calculation of percentages. The cases themselves are well told, but we cannot linger over them, and must be contented with pointing out a few of the more important deductions derived from their study. With regard to *apoplexy*, it appears that those cases which terminate suddenly or very quickly are almost invariably cases of *intra-ventricular* bleeding; extravasation on the surface or even into the substance of the brain is more slow in its action, and the sudden death which sometimes eventually occurs in these cases, after brain symptoms have existed for several hours or days, is really due to secondary ventricular involvement. This fact is justly compared with the well-known phenomena of death from cerebral abscess, which may exist for months or even years, producing great destruction of substance without any very marked symptoms, until finally bursting into the ventricles, this secondary condition brings about a rapidly fatal issue. Bleeding into the *pons* is rather quickly fatal; bleeding into the substance of either hemisphere on the *outer* side of the optic thalamus or corpus striatum causes death more rapidly than bleeding into other parts; and apoplexy of the *right* cerebral hemisphere is more rapidly fatal than when the left side is affected.

As to the condition of the pupils, "no very certain results are obtained, although it may be noticed that in certain cases an absolutely dilated and fixed pupil is connected with disease or injury about the course of the cerebral bloodvessels, whilst a contracted and fixed pupil is often met with when blood is poured out into, or when the disease is present in, the tissue of the brain. . . . So far as my observations of surgical injuries to the brain have gone, no reliance can be placed upon the condition of the pupils as symptomatic of brain hurts, except perhaps in their slow action, or in absence of their action, when light is allowed to fall upon the eyes." The dilatation and fixation of the pupils or their slow response to light, appears to coexist with cerebral compression: free mobility, rather with laceration. *Loss of sight* usually depends on involve-

ment of the optic nerves or tracks: in only one case was it connected with disease of the brain substance, and in this instance "the entire right optic thalamus and a large part of the middle of the right lobe of the cerebellum were reduced to a soft and red-coloured pulp."

"Pain was present when very various parts of the brain tissue were involved, but in every case, when present, it happened that the outer gray matter had been implicated."

With regard to *aphasia*, Mr. Callender remarks upon "the general agreement of these cases with the propositions—that with loss of speech (a) the anterior cerebral lobes, or the parts about the corpus striatum or the motor track, are diseased or injured; (b) that such disease or injury involves the left side; (c) that whilst the parts about the corpus striatum are found to be diseased, it is not evident that the disease or injury is limited in these cases to the third frontal convolution (so-called.)" A curious fact in connection with this subject was that the aphasic condition sometimes disappeared during the existence of delirium.

Convulsions seem to be particularly associated with disease about the track or distribution of great vessels, especially of the middle cerebral arteries, and with the shock of a hemorrhage, and are particularly connected with *left* hemiplegia, and with disease of the right hemisphere external to the optic thalamus and corpus striatum.

This, which is the concluding portion of Mr. Callender's paper, contains five illustrative diagrams, and fully justifies the expectations raised by the first part, the whole forming, as we expressed the belief that it would, "a most valuable contribution to our knowledge of the *anatomy of brain-shocks*."

The second article in the present volume is by WILLIAM S. SAVORY, F. R. S., and is called "*Notes, with Cases, on some of the immediate and remote Effects of Injuries to the Spinal Cord.*" Mr. Savory seems not to be aware that anything has been either written or said concerning spinal injuries since the well-known paper by Sir Benjamin Brodie in the *Medico-Chirurgical Transactions* for 1836 (vol. xx.); hence his remarks will not, we fear, come to some of his readers with the same refreshing charm of novelty which they evidently possess for himself. Still his conclusions have been evidently worked out independently, from his own observations, and have the value therefore which independent confirmatory testimony always possesses. The cases which he narrates are moreover quite interesting in themselves, and, we need scarcely add, are well narrated and clearly analyzed and discussed. A curious fact noted in one case was that when reflex muscular contraction could no longer be evoked in the lower extremities by peripheral irritation, it could still be excited by the combined influence of such irritation with a voluntary effort. The whole paper occupies 28 pages, and a good many of these are devoted to "*spinal concussion.*"

Upon this vexed subject, we cannot see that Mr. Savory has shed any new light: he very properly rejects the statements of the older writers as to the non-existence of spinal lesions in fatal cases of this kind, and says, "even assuming a case of the kind to occur where the minutest microscopic scrutiny by a most skilful observer failed to detect any change, still nothing, I believe, in what is yet understood of the relation of force to matter supports the conception that the function of a nerve centre can be thus struck out, the integrity of its structures being nevertheless unaffected;" and yet shortly afterwards, referring to cerebral concussion, he admits the possibility of "annihilation of function" unassociated "with any actual lesion in the ordinary acceptation of the term," and asks, "If the centres of consciousness may be thus paralyzed, why not the centres of respiration?" For our own part, we utterly disbelieve in any *concussion* of either brain or spinal cord, in which there is no physical lesion; there may indeed be a *mental* condition, or a *general physical condition* (*shock*), either of which or both of which may and often do coexist with injuries of the central nervous system, but neither of which is in any degree essentially connected with the condition habitually and conveniently designated as concussion. Those states of mind or of body may or may not be associated with physical lesion, but to decide that point would be foreign to the present question. But that either cerebral or spinal concussion can exist without lesion—temporary and

evanescent, perhaps, but still a lesion—we do not believe. This lesion need not be either extravasation or laceration; it may be congestion or determination, as evanescent as a blush, or it may be a more or less temporary arrest of cell-action; but to assume that because it is sometimes quickly recovered from, or cannot be definitely recognized after death, it does not exist, seems to us an assumption not only utterly unsupported by well observed facts, but quite at variance with what is actually known, and with all the tendencies of modern pathology.

Art. III., *On Residual Abscesses*, by JAMES PAGET, F.R.S., strikes us as both practical and interesting. "Under the name 'residual abscesses,'" says Mr. Paget, "I would include all abscesses formed in or about the residues of former inflammations. Most of them are formed where pus, produced long previously, has been wholly or in part retained and become dry, or in some form 'obsolete.' But some of them, it is probable, are formed in the thickenings, adhesions, or other lowly-organized products of inflammation long past." These residual abscesses are chiefly met with in connection with disease of the spine or of the various joints, with necrosis of the interior of the long bones, and with old inflammations of the lymphatic glands. They are to be treated as any other abscesses, except that, as their disappearance without discharge is very rare, their suppuration should rather be promoted than retarded. "Many of the cases I have related are instances of the very long time during which a part once damaged by inflammation may remain unsound; and the disappointment felt on the occurrence of a residual abscess may, to some, seem to cast discredit on the practice of permitting or aiding the absorption or drying-up of chronic abscesses connected with diseases of spine or joint. But the discredit is not just; for many patients in whom such abscesses have disappeared have never suffered after-consequences; and, so far as I have yet seen, the healing of discharged residual abscesses is quicker, and attended with much less disturbance than the healing of first abscesses of the same size and in similar situations."

Art. IV., *Two Cases of Complete Dislocation of the Knee forwards, with Rupture of the Popliteal Vessels, requiring Amputation*, by GEORGE LOWE. The subject of this paper is sufficiently expressed in its title. With the following conclusion of the writer we fully agree: "In every case of dislocation of the knee, in which the circulation through the large vessels is arrested, and is not restored on reduction being effected, and when, after reaction is fairly established, the temperature of the limb below the injury is less than the natural standard, and there is a swollen condition of the leg, with a dusky leaden hue, amputation should not be delayed." We would even go further, and say that in any case of dislocation of the knee, complicated with rupture of the popliteal vessels, removal of the limb should at once be practised as a primary measure. Had operative interference not been delayed in Mr. Lowe's cases until gangrene was imminent or (as in the first case) actually present, his patients might have got off with amputation immediately above the knee, instead of in the upper third of the thigh. The successful issue of these two cases should not be looked upon as establishing a precedent for delay, which must render the operation, when finally performed, of much graver prognosis than if it had been resorted to at an earlier period of the case.

Art. VI., by ALFRED COLEMAN, describes *A Convenient Apparatus for the Administration of Chloroform*. This apparatus essentially consists of a graduated glass bottle with a perforated stopper, through which the chloroform escapes drop by drop upon a sponge fixed in a metal tube, open at one end, and by the other communicating with a hollow sphere, which is fitted with two wire gauze diaphragms and an ordinary Snow's face-piece. The patient thus inhales air mixed with a proportion of chloroform never, according to Mr. Coleman, more than 3 to 3.5 per cent. We confess that this apparatus seems to us less adapted to insure safety than Mr. Clover's, while it is not a great deal less inconvenient. Perhaps, when chloroform has to be used at all, the method

usually adopted in this country, with a simple handkerchief, is as satisfactory as either.

Art. X., *A Case of Syphilitic Laryngitis, in which Tracheotomy was successfully performed*, by H. LLOYD WILLIAMS, presents no features of special novelty or interest. The form of tube used was that devised by Mr. Durham, which answered in this case a better purpose than the ordinary instrument.

Art. XI., *Rachitis*, by HOLMES COOTE, is a paper of considerable interest. After describing the three acts upon which the physiological growth of bone depends, Mr. Coote points out, following Volkmann, the disturbing influence which rickets exercises upon each: "The cell growth" [from the periosteum] "which precedes ossification goes on rapidly, while the deposit of earthy matter is insufficient, or ceases entirely. Irregular and often large spaces are formed in the medullary structure. The epiphyseal cartilage becomes swollen and enlarged, and forms those peculiar elevations which have induced people to speak of 'double joints' in connection with this disease. Swellings are also seen in the ribs at their junction with the cartilage." A peculiarity of rickety bones is seen in "the extension of the medullary spaces beyond the line of ossification into the cartilage itself, so that irregular outgrowths of red colour are seen protruding into the blue cartilage." With regard to the treatment of rickets, Mr. Coote lays great stress upon the importance of change of air, especially recommending a seaside residence, and of suitable food and clothing. He objects to the use of tonics, including cod-liver oil, during the acute stages of the disease; thus radically differing from his colleague Dr. Gee, who, it will be remembered, in the last volume of the *Reports*, spoke of cod-liver oil as "a pharmaceutical agent worthy of a place beside iron, Peruvian bark, and mercury," and declared that no time should be wasted over symptoms, but the oil administered from the first, and continuously. Mr. Coote advises the use of movable couches, and, with some restrictions, that of splints or other supporting apparatus. Where the deformity persists in after life he has seen advantage from the sub-periosteal removal of a wedge-shaped piece of bone.

Art. XII., *Lithotomy Cases from Private Practice in the Bala Lake District*, by OWEN RICHARDS, M. D., Aberd. Dr. Richards narrates ten cases, in nine of which the ordinary lateral operation was performed, the tenth being in a woman; three of his patients died, though only one from the results of the operation, the others dying, one from phthisis, and one from bronchitis. The ages of Dr. Richards's patients ranged from 46 to 68 years, and he mentions the curious fact, that during twenty-four years' continuous residence in Bala he has never once been consulted by a person under twenty suffering from symptoms of stone. Dr. Richards prefers to hold the staff in his own left hand while incising the prostate, instead of following the ordinary plan, which intrusts the whole management of the staff to an assistant.

Art. XIII., *Nævoid Elephantiasis*, by THOMAS SMITH, is one of the most interesting papers in the whole volume. This very curious affection, which has been named and described by Prof. Fayrer, seems to consist in the ordinary form of elephantiasis, or Barbadoes leg, *plus* a nævoid condition of the skin and subjacent tissues. Mr. Smith has seen two such cases, the best marked of which forms the text of the present paper. It occurred in a child of nine months, having existed at the time of birth, when it greatly impeded delivery; but since the age of seven months had very much increased. The whole of the right[1] lower limb and buttock were hypertrophied, the leg and foot being in a condition undistinguishable from that seen in elephantiasis Arabum, while the thigh, though proportionately less enlarged and softer, was extensively stained on its outer side, with a dusky red cutaneous nævus. The limb was sensibly warmer than its fellow, from three to four times its circumference, and three inches longer, the lengthening being due to hypertrophy of the integuments over the heel and plantar surface. The swelling diminished somewhat under firm bandaging, but

[1] Incorrectly given in the text as the *left* limb: the plates and subsequent descriptions show that the *right* was the limb affected.

the child soon after died without any very obvious cause. A very good description of the affected part, which was removed and carefully dissected, is added, and illustrated with three excellent lithographic plates. Mr. Smith refers to several cases lately published of *elephantiasis* accompanied with *lymphorrhœa*. Our readers will find such a case, reported by Dr. J. C. Morris, in the Transactions of the Philadelphia College of Physicians, in the number of this Journal for April, 1869, p. 392, and may refer with interest, in connection with the subject of elephantiasis in general, to a discussion and elaborate report by Drs. W. Pepper and Andrews in the Proceedings of the Pathological Society, in our number for October of the same year, pp. 424–428.

"It is thus not unlikely," adds Mr. Smith, "that under the term Elephantiasis Arabum, three diseases, quite distinct in their origin, though identical in their results, have been often included, namely, what we may term lymphatic elephantiasis, vascular or nævoid elephantiasis, and the ordinary elephantiasis Arabum of climatic origin. These diseases, though arising from different causes, have this in common, that as a consequence, the elements of nutrition (whether contained in blood, chyle, or lymph) are in excess in the part affected, and that as a natural result the overfed tissues become overgrown, the overgrowth being specially manifest in those tissues that are more lowly organized, and are perhaps less discriminative in the materials they select for their nutrition."

The question of tying the common iliac artery had been discussed before the death of the patient, and Mr. Smith therefore, as an experiment, tried to apply a ligature upon the corpse, but found so free a flow of blood from the spongy venous tissue in the lumbar region, as to render it very doubtful whether the operation would have been practicable during life.

Art. XIV., *Protoxide of Nitrogen as an Anæsthetic*, by Alfred Coleman. Mr. Coleman evidently believes that the coming man will use nitrous oxide more freely than the present one; after some reflections (which we cannot but think uncalled for) upon those who have written against this anæsthetic agent, Mr. Coleman proceeds to describe the improvements which have recently been introduced in the mode of its preparation and administration. The first of these is the facility now offered for procuring the gas in a condensed form—fifteen gallons being compressed into five pints; the second, the adaptation of a lime box so that the gas can be purified from carbonic acid and thus breathed over and over again; and the third, certain modifications in the apparatus itself, proposed by Mr. Clover. Mr. Coleman thinks the protoxide of nitrogen as now used the safest agent where prolonged anæsthesia is not required, and believes that if it should at any time produce unfortunate results, it will be from rupture of diseased vessels in the brain. Mr. Coleman believes that nitrous oxide gas is not decomposed in either the lungs or the blood, and in support of this position gives several analyses of the expired gas.

Art. XVIII., *Intra-Ocular Growths in Children*, by Bowater J. Vernon, is of pathological as well as surgical interest. The older writers habitually described these growths as of a cancerous nature, but "cancer," says Mr. Vernon, "in the modern acceptation of the phrase, is almost unknown as occurring within the eyeball."

"The tumours which appear in the retina may be said to be of two kinds, or at least appear as two varieties of one kind, according as they are soft or firm in texture, consisting simply of small cells of uniform size and shape, or approaching the sarcomatous tumours in the variety of their cell formation, and the greater or less amount of the fibrous stroma which they contain. Virchow has called these tumours gliomas and gliosarcomas, and considers them as analogous to certain cerebral tumours which he describes as taking their origin in the neuroglia or delicate connective tissue which exists throughout all large nerve-centres and nerve-trunks." These tumours occur in very young children, sometimes even in fœtal life, are more frequent in males than in females, occasionally appear simultaneously in both eyes, and may occur in several members of the same family. They make their appearance in the outer layers of the retina, and as they grow cause increased ocular tension, this being to some ex-

tent a diagnostic sign, as retinal detachment from effusion is almost always accompanied by diminished tension. When the disease spreads backwards along the track of the optic nerve, death is sometimes very rapid from extension of the morbid condition within the head. The only treatment to be recommended consists in complete and early extirpation, though even that will not always prevent the further spread of the disease.

Art. XX., and the last in the volume, gives a *Comparison of the Death Rates after Amputations in Country Private Practice, in Hospital Practice, and on Country Patients in a Town Hospital*, by GEORGE W. CALLENDER. This is an elaborate and we think valuable statistical contribution upon the much vexed question of "*Hospitalism*," which is just now violently agitating our professional brethren in England and Scotland. Mr. Callender attempts to, and, we think, fully succeeds in showing the unfairness and utter worthlessness of the statistics upon this point, published by Sir James Y. Simpson in the *Edinburgh Medical Journal*, an exposition which does not at all surprise us, as we have ourselves had occasion to comment upon the learned Baronet's loose way of using figures in the matter of the Acupressure Controversy (see No. of this Journal for July, 1867, p. 235). Still Mr. Callender's own statistics are not entirely satisfactory, though probably as much so as any that are likely to be obtained: thus, with regard to the *country* patients treated in *town* hospitals, Mr. Callender says that many of them were "sent up from the country on account of the remarkable severity or obscurity of their ailments," to which of course his antagonists might reply, that it is more probable on the contrary that they were selected cases, as such only could bear the expense and fatigue of transportation to the metropolis. The inference which Mr. Callender draws from his investigations we believe to be a very true one, viz., that the results of amputations depend more upon the condition of the patients than upon the place where the operations are done; still we cannot help thinking that his opponents have a germ of truth on their side also, and that large hospitals though indispensable even for the treatment of surgical cases, are yet susceptible of improvement in hygienic conditions.

The usual reports of the registrars are not included in this volume, an omission which we join the editors in thinking a matter of regret; it is proposed, however, in the next volume to publish notices of the hospital practice on a different plan. We do not know whether our regularly recurring annual complaints have had any effect in bringing it about, but we are glad to be able to say that the present volume contains not only an index to its own contents, but likewise indexes, separately paged, for each of the preceding volumes. These indexes are not so full as we could wish, but, such as they are, are of very considerable value. J. A., JR.

We shall now proceed to notice the articles treating on subjects of practical medicine. The first of these, the initial paper in the volume, is a short obituary notice of Dr. EDWARDS, one of the physicians of the hospital, and favourably known as the author of the series of *Statistical Reports*, which, under his direction as Medical Registrar, were published from year to year, and which gave evidence of the industry with which he discharged a methodical and somewhat monotonous duty.

Art. V. *Contributions to the Pathology of Chorea*, by HENRY M. TUCKWELL, M.D., Oxon. Dr. T., who is a supporter of Dr. Kirkes' views in regard to the frequent dependence of chorea upon embolism of the cerebral arteries, finds them entirely confirmed by the history and results of the autopsy of the case of fatal chorea, which he reports.

The following extracts are taken from notes made at the autopsy: "The brain was well developed and presented nothing abnormal in its coverings or surface. The upper half of each cerebral hemisphere was carefully sliced down to a level with the corpus callosum, and the lateral ventricles were opened without any trace of softening being detected in either the gray or white matter of this part. The corpus callosum and fornix were firm and healthy. No excess of fluid in the lateral ventricles. The brain was now turned over, and the cerebral

arteries were carefully followed up by dissection to their smaller branches, without any evidence of obstruction in any part of their course. But on tracing out the posterior cerebral artery, and thereby displacing the middle cerebral lobe, it became manifest that the under part of this lobe on the right side was in a state of softening. This softening was not excessive, but easily recognizable; it had not, apparently, affected the very surface of the convolutions, but involved the deeper layers of the cortex, and more especially the subjacent white substance, extending upwards into the neighbourhood of the corpus striatum and optic thalamus, which ganglia lay, as it were, imbedded in a nest of softened cerebral matter. The softened tissue was redder than the surrounding healthy white substance, this red tinge being especially pronounced in the deepest layer of the cortex. The corpus striatum was, seemingly, not itself affected. The optic thalamus was encroached on at its under and outer aspect by the disease, but was in the main firm and apparently natural. . . . . A microscopical examination of the fresh brain-tissue showed that in those parts, which to the naked eye appeared soft, many of the small bloodvessels were dotted along their walls with minute granules scattered and in clusters. In the firm, healthy looking brain-tissue no such appearance could be detected. . . . . The mitral valve, looked at from its ventricular aspect, seemed perfectly competent, and presented no unusual appearance; but examined from its auricular aspect, by opening out the left auricle, it was altered as follows: A line of numerous, bright, clustering, warty vegetations, some as large as a pin's head, others so minute as to be only just visible to the naked eye, and that in a certain light, but shining like little white beads when slightly magnified, extended in a sinuous course all along the free margin of each cusp. In two or three places these little growths appeared to have been shed off, for they hung only by a fine pedicle to the line of attachment, and clung close to the chordæ tendineæ."

Embolic patches were, moreover, found in the kidneys.

The condition of the heart above described also existed in the case reported by the author in the *British and Foreign Medico-Chirurgical Review* for October, 1867, and he believes that it is one of the most frequent lesions in this disease. Dr. Hughlings-Jackson and Dr. Broadbent have both adopted the theory of the embolic origin of chorea, and have located the exact seat of the disease; the former in the nerve tissue forming the convolutions near the corpus striatum; the latter in the sensori-motor ganglia themselves, and both hold that the chorea arises from the irritability or disordered nutrition of these parts, which results from the shutting off of their due supply of blood, and as a similar condition of the cerebral hemispheres will produce delirium, so chorea may be regarded as a delirium of the sensori-motor ganglia. If the disturbance of nutrition be carried still further, it results in paralysis, and it will be remembered that paralysis frequently alternates with choreic convulsions. Dr. Broadbent, while he insists upon embolism as the usual cause, says, that as the sensori-motor ganglia are the seat of the disease, anything which produces disturbance in their nutrition will give rise to it, and it may therefore occasionally depend upon peripheral irritation, producing disordered nutrition of this part of the brain.

Dr. Tuckwell, in corroboration of his opinion that the condition of the valves found in the case which he reports, is a frequent one in chorea, refers to a paper by Dr. Ogle, an analysis of which will be found in another part of this number, and which contains the histories of sixteen fatal cases, in ten of which fibrinous concretions were found on the valves, and in eight of these ten on their auricular surface. Dr. Broadbent meets Dr. Ogle's objection that in cases of "acknowledged capillary embolism, chorea has not been present, but rather the symptoms and post-mortem appearances of pyæmia and gangrene," with the reply that the condition of the heart which gives rise to the symptoms of pyæmia, is not that found in the choreic heart. "In the former we see a process of disintegration and breaking down of the valves going on, so that the degenerate débris, which passes into the circulation, acts evidently on the blood like the putrid fluids from a surgical wound, and death follows rapidly from pyæmia. In these cases are found, here and there—it may be in one organ only, as the kidney or spleen—emboli of various sizes, while the general appearance of the

internal organs is just that which is met with in blood-poisoning. But how different is the choreic heart. Here there is no process of disintegration in the valves, but a collection of fresh vegetations which can do no more than act mechanically or as irritants."

Dr. Barnes is another opponent of the embolic origin of chorea, and asks the question: "Do you make a distinction between fatal and non-fatal cases? If you don't, you must allow that embolism is a very frequent and benign affection, which in the great majority of instances recovers." This Dr. Tuckwell answers by saying that many of the cases which get well may be of reflex origin, and that he sees nothing improbable in the recovery of cases from embolism, inasmuch as cases of hemiplegia from embolism may and do recover. Dr. Tuckwell also holds that rheumatism is generally the cause of the condition of the valves which gives rise to chorea, and that this is especially true of children, and says that the reason that the pre-existence of rheumatism is not more clearly made out, is simply that, in many cases, rheumatism occurring in children presents certain anomalies which prevent its recognition. Thus there is in young persons an absence of great pain in or swelling of the joint, and of the profuse sweating which characterizes the disease in adults. Chorea, moreover, occurs most frequently in those who are most exposed to the causes of rheumatism, namely, the poor, while it is comparatively rare among those who are in comfortable circumstances.

The above is an analysis of this very able and instructive paper, and we place it as we did Dr. Ogle's without comment before our readers, merely remarking that in our experience, the condition of the heart which most frequently gives rise to embolism, is not that which at the same time produces pyæmia. A coloured plate accompanies this paper.

Art. VII. *Cirrhotic Enlargement of the Liver*, by SAMUEL J. GEE, M. D. The patient in this case, a man of intemperate habits, presented evidences of an enlarged liver, which extended from the crest of the ilium to the fourth rib. The lower edge of the organ was felt with difficulty, as the man was unusually fat, but irregularities could be distinguished on its surface. The great increase of size excluded the diagnosis of a fatty liver, the general condition of the patient, the idea of cancer; and against lardaceous disease, there was the depth of the jaundice, the irregularities of the surface of the organ, and the absence of lardaceous disease elsewhere. Every other diagnosis but enlargement from progressive increase in the connective tissue of the organ, not going on to contraction, seemed to be excluded. At the autopsy the liver was found to weigh 100½ ounces, not to be very dense, somewhat flabby, and having an uneven surface. The lobules were separated by a whitish, more translucent tissue than the normal tissue of the liver, everywhere distinct and abundant; no doubt connective tissue between the lobules. It is not stated positively whether the microscope confirmed the diagnosis or not; the fact being only mentioned that under the microscope the hepatic lobules consisted of very fatty epithelium and fatty molecular detritus. The weight of the organ, 100½ ounces, is small when we take into consideration the fact that it was said to have occupied a very large part of the abdominal cavity.

Appended is a short account of a similar case, in which the liver weighed 104 ounces. Dr. Gee does not think that had the lives of these patients been prolonged, their livers would ever have undergone such a degree of contraction as is usual in cirrhosis in the ordinary acceptation of the term.

Art. VIII. *The Hospital Midwifery Statistics.* From January 1, 1862, to December 31, 1868, prepared by CLEMENT GODSON. The tables contained in this paper are of interest. The following is an analysis of them: Of 5734 deliveries there were 49 cases of twins; 1 in 117.02, or 0.855 per cent. Of the 5783 children born, 3065 were males, that is 53 per cent.; 2718 were females, that is 47 per cent., so that the excess of males over females was 6 per cent.; 5502, or 95.95 per cent., were head presentations; 13, or 0.24 per cent., were face presentations; 64, or 1.12 per cent., were breech presentations; 35, or 0.61 per cent., were presentations of some part of the lower extremities; 5504, or 95.17 per cent., were born living. Twenty-one women, or 0.37 per cent., died either

within a month of delivery or from the effects of labour. The forceps were employed 128 times. Craniotomy was performed four times, and in every instance the mother recovered.

Art. IX. *Acute Pemphigus*, by Samuel J. Gee, M. D., London. This is the report of a case of the so-called acute pemphigus, the existence of which is alternately denied and affirmed by authorities of equal respectability in dermatology. The patient was a girl, 4 years of age, who, up to the time of the appearance of a rash resembling measles, had been quite well. Three days later all the red spots were covered with watery blebs. Seven days after this she was admitted into Dr. West's ward at the hospital. The thermometer, being placed in the axilla, indicated a temperature of 103° F. The temperature continued high through the greater part of the attack. The following is the description of the eruption, from Dr. Gee's notes, taken at the time of her admission: "The blebs are perfectly similar to those caused by cantharides, the first appearance is very much like measles, but less port-wine coloured, rather brighter red; papulæ feel rather rougher than those of measles. The large patches are made up of aggregated papulæ. Upon these papulæ appear minute vesicles, so that the redness at first is in great excess of the vesication, the appearance is not unlike a patch of herpes; each vesicle enlarges until it is of the size of the papula; *the blebs are made up of the confluence of numerous vesicles upon the same patch.*" The disease seems to have run its course in about seven weeks.

As Dr. Gee himself intimates, this will not universally be regarded as a case of acute pemphigus, and the formation of blebs from the confluence of several vesicles, as stated in that part of the description we have italicized, is nowhere mentioned as the usual manner of appearance of the eruption in pemphigus.

Art. XV. *Contribution to Cerebral Pathology*, by W. S. Church, M. D. Oxon. The cases recorded in this paper are a continuation of those published in the preceding volume of the Hospital Reports. In the histories and results of the autopsies of the first five cases, Dr. Church finds a confirmation of the opinion he expressed last year, that there was no good reason for separating the form of disease characterized by the presence of small granulations on serous membranes, and similar granulations in the lungs from tuberculosis. The disease termed "la granulie," by Prof. Empis, is not distinct from and coincident with tuberculosis, but is one of the many forms of deviations from the normal condition met with in the tissues of tuberculous subjects. The cases may be classed under the following heads: Tubercular meningitis, 5; infantile convulsions, 2; congestion of the brain, 1; atrophy and induration of brain, 3; acute meningitis, 2; softening of the spinal cord, 2: softening of brain, 2; Embolism, 2; apoplexy, 5; aneurism of cerebral arteries, 2; tumour of the brain, 1; carcinoma of dura mater, 1. One of the cases of intracranial aneurism is especially interesting from the fact that the age of the subject, 13 years, is the youngest yet recorded in this disease.

A table of 12 cases of intracranial aneurism, occurring in persons 20 years of age or under, accompanies this paper. All the cases except the one above alluded to have been previously tabulated, and the table by no means contains all the reported cases of aneurism of the cerebral arteries which have occurred at these ages. In six of the twelve cases there is good reason to believe that the aneurisms were due, to emboli plugging the arteries, and thus causing a sudden stress upon the walls of the vessels, behind the seat of obstruction, which might occasion rupture of one of its coats, or the presence of the occluding clot might lead to changes in the nutrition of the arterial wall, which would be followed by subsequent yielding before the blood stream.

Art. XVI. *Note upon Apomorphia and Chlorocodide*, by Samuel J. Gee, M. D., Lond. Apomorphia is a new base obtained by Dr. Matthiessen, and is possessed of very powerful emetic properties, in doses of $\frac{1}{4}$ grain, by the mouth, and $\frac{1}{16}$ grain subcutaneously. It, moreover, acts very speedily, but unfortunately in many instances depresses the patient, not, however, by causing gastro-intestinal irritation or inflammation. The high price of the article

makes it unlikely that it will be ever much used as a remedy. Apomorphia is derived from codeia, and in the process an intermediate body, chlorocodide, is formed. The relationship between these bodies will be understood from their formulæ :—

Apomorphia, . . .	$C_{17}H_{16}NO_2H$	$=C_{17}H_{17}NO_2$.
Morphia, ...	$C_{17}H_{16}NO_2HH(HO)$	$=C_{17}H_{19}NO_3$.
Codeia, ...	$C_{17}H_{16}NO_2CH_3H(HO)$	$=C_{18}H_{21}NO_3$.
Chlorocodide, . . .	$C_{17}H_{16}NO_2HC_3H(Cl)$	$=C_{18}H_{20}ClNO_2$.

Experiments with chlorocodide show that it is possessed of properties resembling those of codeia. Thus a watery solution was injected subcutaneously into a cat. Salivation and dilatation of the pupils was produced in less than ten minutes. A somewhat larger dose produced extreme restlessness, and when nine and a half grains had been injected, the animal passed rapidly into a tetanic condition, which lasted for about three-quarters of an hour, when death supervened from convulsions. The only property of chlorocodide which holds out any promise of usefulness in medicine is its extreme bitterness. A quarter of a grain taken by the mouth, causes an uncommon sense of tonicity in the abdomen, and does not produce the same fulness and aching of the head as quinia, which does not possess nearly the same degree of bitterness.

Art. XVII. *Observations upon the Action of Ipecacuanha and its Alkaloid Emetia*, by DYCE DUCKWORTH, M. D., Edin. Dr. D. was induced to prosecute some inquiries as to the properties of emetia, in consequence of the difficulty frequently experienced in procuring the action of emetics in young children, when administered by the mouth. The alkaloid has been little used by physiologists or therapeutists, and is an amorphous substance, devoid of odour, and having the colour of scammony powder, and a bitter taste, which most resembles that of opium or gentian. It is almost insoluble in cold water, but is soluble in hot water, and freely so in alcohol and the acids. Four to six ounces may be obtained from 100 pounds of the ordinary root. The test is the tincture of nutgalls, which throws down a dense precipitate from a solution of this substance; a tannate of the alkaloid, according to Pereira, being formed. The tincture of nutgalls is also an antidote to emetia, and will prevent its action if administered at the same time, and may be used to detect its presence in the urine of animals poisoned by it. Some of the results of Dr. Duckworth's experiments are at variance with those of Dr. Pécholier, for he tells us that the respirations became more frequent, and the cardiac action not less frequent than in health. In his experiments there was always found more or less engorgement of the lungs, and in some cases even lobular pneumonia, and more or less congestion of the gastro-intestinal tract, and chilliness of the surface. From these and other circumstances the experimenter was induced to believe that ipecac. has some special action upon the vagus, and that is probably of the nature of an exhausting stimulus. And this view is corroborated by the fact that similar conditions are produced by the section of the nerve. No noteworthy changes in the brain have been observed. In most of the cases of poisoning from this substance the urine contained albumen.

Art. XIX. *What becomes of the Medical Students*, by JAMES PAGET, F. R. S. Mr. Abernethy is said to have exclaimed on one occasion on entering his lecture-room and seeing it crowded with students, "God help you all! What will become of you?" The present communication is an answer to this question, by Mr. Paget, who tells us what became of a thousand of his pupils, within fifteen years of their entrance at St. Bartholomew's Hospital. Of the thousand 23 achieved distinguished success, 66 achieved considerable success, 507 achieved fair success, 124 achieved very limited success, 56 failed entirely, 96 left the profession, 87 died within 12 years of commencing practice, 41 died during pupilage. Among those who are considered to have achieved distinguished success are the present Professors of Anatomy at Oxford, Cambridge, and Edinburgh. Ninety-six, or nearly 10 per cent. of the whole number left the profession after beginning either its study or its practice. To place against this, there were only seven who came to the profession from other

pursuits of life, and of these five again changed their mind and never engaged in practice. Of the whole number nearly 13 per cent. were dead within fifteen years. This proportion, we are told, agrees so nearly with the general average mortality, that it gives no reason for considering the medical profession either less or more healthy than other pursuits, at least in its earlier stages, for according to the English Life Table, No. 3, out of any 1000 males, who have attained the age of 19 years, 131 will die within 15 years.

In conclusion, Mr. Paget says: "In remembering those with whom I was year after year associated, and whom it was my duty to study, nothing appears more certain than that the personal character, the very nature, the will, of each student had far greater force in determining his career than any helps or hindrances whatever. All my recollections would lead me to tell that every student may draw from his daily life a very likely forecast of his life in practice, for it will depend upon himself a hundred-fold more than on circumstances. The time and the place, the work to be done, and its responsibilities, will change; but the man will be the same, except in so far as he may change himself."

J. H. H.

ART. XXIV.—*A Text-Book of Practical Medicine with Particular Reference to Physiology and Pathological Anatomy.* By Dr. FELIX VON NIEMEYER, Professor of Pathology and Therapeutics, Director of the Medical Clinic of the University of Tubingen. Translated from the Seventh German Edition by special permission of the Author, by GEORGE H. HUMPHREYS, M.D., etc. etc., and CHARLES E. HACKLEY, M.D., etc. etc. Vol. I., pp. xv.–731. Vol. II., pp. viii.–770. New York: D. Appleton & Co., 1869.

So many excellent text-books on the Practice of Medicine are at present within the reach of the American medical student, that the task which the translators of Dr. Niemeyer's work have imposed upon themselves may seem to many an unnecessary one. A more intimate acquaintance with the book will convince most physicians that this conclusion is a hasty one, and we agree with the opinion expressed in the preface to the American edition that its perusal will be attended with pleasure and profit. Familiar, as we have been for some time with an earlier edition, we were ourselves fully prepared to give the translation a favourable reception, and from its general excellence we are disposed to think that it will soon take its place among recognized text-books. We do not mean by this that the works of Dr. Wood, Dr. Watson, or Dr. Aitken are in any danger of being superseded, for all of these have so many points of excellence, that a long time must elapse before they will cease to be valued either by the student or his teacher, but we think that it is probable that it will take equal rank with them.

One advantage which these volumes have, is that they render us familiar with German methods of practice. Although a knowledge of the pathology of Rokitansky, Virchow, and others is tolerably freely diffused throughout the medical community of this country, there are many, even among those of us who read the language, to whom the therapeutics of the Germans are entirely unknown, and a work of this kind will therefore be welcome, presenting, as the translator's preface tells us it does, "a concise and well-digested epitome of the results of ten years of carefully recorded clinical observation by the most illustrious medical authorities of Europe, together with many valuable and practical deductions regarding the causes of disease and the application of remedies, such as we believe have not yet been assembled in any single work."

Unlike the different works on Practice mentioned above, this one contains no introductory remarks on the subjects of general pathology, etiology of disease, general therapeutics and diagnosis, but we are at once introduced to the subject of special pathology—the first chapter being devoted to hyperæmia or catarrh of the larynx. The former arrangement has the advantage of preventing a good deal of repetition, but, on the other hand, there are many students

who prefer to have each disease fully and separately discussed, and for purposes of reference the plan of Dr. Niemeyer's book is certainly a convenient one.

Our author, while he evidently does not inculcate a blind reliance upon drugs or methods of treatment which have the sanction of age, and but little else to recommend them, nevertheless is a firm believer in his art, and does not teach the distrust of all remedial measures, so common at the present day, which must in the end tend to destroy the confidence it is so necessary the patient should place in his physician. Some of the remedies recommended differ from those in common use here, and many of the familiar articles of the materia medica are used in diseases in which we rarely or never employ them, but in every instance the special indication is distinctly pointed out. Dr. Niemeyer, moreover, believes that the effects of medicines upon the lower animals or upon man in health are not always to be relied upon as furnishing indications for their administration in disease, but, on the contrary, holds that the science of therapeutics can only approach perfection when the action of medicines in disease is carefully studied and noted.

A review of Dr. Niemeyer's book is scarcely called for at the present time; we shall therefore content ourselves with pointing out its general plan, and some of the author's peculiar views in regard to therapeutics or pathology, which we think will be of interest to our readers. The first part of the first volume is devoted to diseases of the respiratory organs; the second, to diseases of the circulatory organs; the third, to diseases of the organs of digestion; the fourth, to diseases of the liver and bile ducts; and the last, to diseases of the spleen. In the second volume the following subjects are treated: 1, diseases of the urinary organs; 2, diseases of the sexual organs, both male and female; 3, diseases of the nervous system; 4, diseases of the skin; 5, diseases of the organs of locomotion, under which head are included rheumatism and gout; 6, constitutional diseases.

Some of the views in regard to inflammation of the air passages differ from those generally held. According to Dr. Niemeyer, there are three varieties of pneumonia.

1. "Croupous pneumonia, in which the air cells are involved in a process identical with that which attacks the mucous membrane of the larynx in laryngeal croup."

2. "Catarrhal pneumonia, a process intimately related to that already described as catarrhal bronchitis and laryngitis, producing an augmented secretion, and active generation of young cells (pus corpuscles), but in which no *coagulable* exudation is formed. In both these varieties of inflammation the inflammatory products are thrown out upon a free surface, the tissue of the lung itself suffering no essential disturbance of nutrition."

3. "Interstitial pneumonia, which is an inflammation involving the walls of the air vesicles and the interlobular connective tissue. As in the human subject, this latter form is always a chronic disease; it has been also called *chronic pneumonia*, in contradiction (*sic*) to the other varieties, whose course is usually acute."

It is the second variety which Dr. Niemeyer believes to be, in the great majority of cases, the exciting cause of phthisis, since its products have a great tendency to undergo the so-called caseous degeneration. The author's views of the relation which pneumonia bears to phthisis were noticed by the present writer in the October number of this Journal for 1868, and it is therefore not necessary to refer to them more fully, except to say that the author's views, if literally understood, would place phthisis among the purely local diseases. The several forms of inflammation indicated above appear to be capable of affecting any of the organs, undergoing only those modifications which difference of tissue renders necessary; thus we have a catarrhal, a croupous, and an interstitial or diphtheritic inflammation of the larynx; and so, to a certain extent, of the liver.

Our author believes that the coma of apoplexy is not due to the pressure of the clot, but to anæmia of the brain, and in order that his views may be thoroughly comprehended, we will quote his own words. "It is usually supposed that the apoplectic fit is a result of the pressure or bruising of the nerve

filaments and ganglion cells of the entire brain by the extravasation. However, it is evident that this pressure can never exceed that of the blood in the cerebral arteries; for, as soon as the pressure in the parts around the arteries is as great as that of the blood in the vessels, no more blood can escape from the latter. But, from experiments that we can make on peripheral nerves, there is no doubt that such a pressure is entirely insufficient to annul the excitability of the nerve filaments. The following fact also tends to disprove the current explanation: if the symptoms of paralysis depended upon the pressure to which the filaments of the brain are subjected in apoplexy, bleeding should remove these symptoms not only in some, but in all cases, provided enough blood be drawn to lessen the pressure in the whole vascular system, particularly in the arteries. . . . . We refer the apoplectic fit to sudden compression of the capillaries, that is, anæmia of the brain. In all large hemorrhages this anæmia may not only be recognized with certainty after death, but even during life it shows itself by a very important symptom, which is usually falsely interpreted, that is, by a remarkable pulsation of the carotids. This symptom is very generally regarded as a sign of 'increased pressure of blood to the head,' although it really indicates that the flow of blood into the skull is obstructed; we may at any moment induce the same phenomenon in the artery of the finger by tying a string tightly around the end of the finger."

As the subject of venesection in the treatment of acute inflammation is at the present time exciting much attention, the tendency being towards the almost entire abandonment of a remedy which was formerly regarded as the sheet anchor of the physician in his contest with disease, it will be interesting to learn what conditions are regarded by Dr. Niemeyer as indications for its employment. It will be seen by the extract which we give below, that bleeding is not recommended simply because the patient is the subject of an inflammatory or febrile disease, for he holds that it has not the power of shortening these diseases, but simply with the view of preventing or modifying certain complications which place the life of the patient in danger. As our author expresses his opinions on this point more fully, while speaking of the treatment of pneumonia, than in any other connection, we quote his indications for venesection:—

1. "When the pneumonia has attacked a vigorous and hitherto healthy subject, is of recent occurrence, the temperature being higher than 105° F., and the frequence of the pulse rating at more than one hundred and twenty beats a minute. Here danger threatens from the violence of the fever; and free venesection will reduce the temperature, and lessen the frequence of the pulse. In those who are already debilitated and anæmic, bleeding increases the danger of exhaustion. Should the fever be moderate, bloodletting is not indicated, even in healthy and vigorous individuals. It cannot cut the fever short, and indeed the fever is more apt to persist, although in a somewhat more moderate degree, so that the enfeebled patient is thrown into greater danger than if he had had to pass through a more violent fever, but with unreduced strength."

2. "When collateral œdema in the portions of the lung unaffected by pneumonia is causing danger to life, the pressure of the blood is reduced by bleeding; and, by prevention of further transudation of serum into the vesicles, insufficience of the lung and carbonic acid poisoning are averted. Whenever the great frequence of respiration in the commencement of a pneumonia cannot be traced to fever, pain, and to the extent of the pneumonic process alone, as soon as a serous, foamy expectoration appears, together with a respiration of forty or fifty breaths a minute, and when the rattle in the chest does not cease for a while after the patient has coughed, we ought at once to practise a copious venesection, in order to reduce the mass of blood, and to moderate the collateral pressure."

3. "The third indication for bleeding arises upon the appearance of symptoms of pressure upon the brain, not headache and delirium, but a state of stupor or transient paralysis."

In pneumonia, as well as other internal inflammations, Dr. Niemeyer thinks highly of the external use of cold water. In pneumonia, he recommends that cloths dipped in cold water and wrung out, should be applied to the affected side of the patient's chest every ten minutes. This treatment, unusual as it

is, and troublesome as it must be to the nurse, does not seem to meet with the opposition which might be expected; on the contrary, it brings about speedily so great a reduction in the frequency of the pulse, in the temperature of the skin, and in the severity of the pain, that the patient and his friends are said eagerly to demand it.

Great prominence is given to the alkaline-muriatic mineral waters in the treatment of chronic catarrh of the air passages; the indications for their use are, however, not very clearly given, and the author acknowledges that it is not always easy to distinguish those cases, upon the course of which they have a decided influence from those in which they have no effect. Nor is it possible to say upon what this influence depends, although there is no scarcity of hypotheses to explain it. According to one theory, these mineral waters supply the salts that are lost to the system by the excretion of mucus, which, as is well known, contains certain salts in greater quantity than the blood, but this would hardly explain the resolution of the catarrhal process which frequently takes place under their use. Virchow found that very dilute solutions of the alkaline carbonates were capable of exciting the ciliary movement in epithelium, and from this fact the inference is drawn that their use tends to re-establish the extinguished or repressed ciliary motion. Our own country abounds in medicinal springs of great value, but, so far as we know, their waters are but little used in the treatment of cases of chronic bronchial or laryngeal inflammation.

We cannot close this short notice without bearing testimony to the excellence of the translation. Knowing by experience that it is not always easy to avoid the idioms of a foreign language, and at the same time to convey the meaning of the author, it gives us pleasure to confirm an opinion, which we have seen elsewhere expressed, that were it not for the title page, there would be little to call attention to the fact that this book is the work of a German. There are a few mistakes, and some of these are typographical; they are, however, very unimportant, and do not detract from the general excellence of the work. In all respects the book is issued in a manner which reflects credit upon the publishers. J. H. H.

ART. XXV.—*Recent works on Stricture of the Urethra.*

1. *De l'Uréthrotomie Externe dans les Rétrécissements Uréthraux Graves ou Compliquées.* Par le Dr. EUG. BOECKEL, Professeur Agrégé à la Faculté de Médecine de Strasbourg. 8vo. pp. 36. Strasbourg, 1868.

On External Urethrotomy in Severe or Complicated Urethral Strictures. By Dr. EUG. BOECKEL, etc.

2. *On External Perineal Urethrotomy, or an Improved Method of External Division of the Urethra in Perinæo, for the Relief of Obstinate Stricture, with Remarks on the Preparatory and After-Treatment.* By J. W. S. GOULEY, M. D., Professor of Clinical Surgery and of Genito-Urinary Diseases in the University of New York, etc. etc. 8vo. pp. 32. New York, 1869.

3. *On the Immediate Treatment of Stricture of the Urethra, by the employment of the "stricture dilator."* By BERNARD HOLT, F. R. C. S., etc. etc. Third Edition. 8vo. pp. xii., 136. London: John Churchill & Sons, 1868.

4. *Clinical Lectures on Diseases of the Urinary Organs.* By Sir HENRY THOMPSON. (Lectures II. and III.) 12mo. pp. 204. Philadelphia: Henry C. Lea, 1869.

WE have placed together the titles of the four works named above, in order to bring to the attention of our readers the modes of treatment for urethral stricture which are principally in vogue at the present day, and to show what are the statistical results, as reported, of the various methods. To begin with the last work on our list, which was noticed in the number of this Journal for April, 1869, we will say that we think that Sir Henry Thompson but expresses the general opinion of the profession, when he declares that for strictures which admit the passage of an instrument, simple dilatation should be the ordinary

remedy, and other methods but exceptionally resorted to. There are, however, as long ago pointed out by Mr. Bryant of Guy's Hospital, a certain number of cases which readily admit a catheter, and yet which cannot be cured by dilatation, either from the stricture being contractile or resilient, or from the idiosyncrasy of the patient causing an intolerance of catheterization, shown by the occurrence of a combination of constitutional symptoms which now commonly receives the name of urethral fever. (See *Guy's Hospital Reports*, 3d S., vol. iv. p. 80.) For such cases the surgeon may choose between three plans of treatment, viz: internal urethrotomy from before backwards (as practised by Civiale and Thompson), external urethrotomy with a guide (as practised by Syme), or the *immediate treatment* of Mr. Holt, which he formerly practised by rapid dilatation, but for which he has now substituted *splitting* of the stricture.

Mr. Holt's method has been extremely, not to say marvellously successful in his own hands: no less than 670 strictures has he split, with only two deaths, one from renal disease, and one from pyæmia following an abscess at the neck of the bladder. Had other surgeons succeeded equally well, we might lay down our pen, believing that the perfection of stricture treatment had at last been obtained; but unfortunately the operation has done less well in the hands of others, and therefore, while acknowledging the claims of Mr. Holt's method to the favourable attention of surgeons, we cannot consider that its pre-eminence over other plans is yet established.

The operation of external urethrotomy with a guide is applicable to strictures behind the scrotum, and that of internal urethrotomy for those in the anterior part of the urethra. Syme's operation has been very successful in his own hands, that distinguished surgeon having cut seventy or eighty patients before he met with a single fatal case. Sir Henry Thompson collected, in the second edition of his work on Stricture, 219 cases of this operation, which gave but fifteen deaths, while twelve cases by French and German operators, collected by Dr. Boeckel, give two deaths, neither, however, strictly attributable to the operation, one being from pyæmia, and one from hemorrhage following hospital gangrene.

For strictures which will not admit the passage of an instrument (and we believe the existence of such strictures is now acknowledged by every one, except Sir Henry Thompson), the principal modes of treatment are internal urethrotomy from before backwards, and external urethrotomy or perineal section. It is as furnishing means of justly appreciating the latter operation that the pamphlets of Dr. Boeckel and of Dr. Gouley are, it seems to us, of special value.

There are four conditions in which Dr. Boeckel considers external urethrotomy to be indicated: these are: 1. Cases of impassable stricture complicated with retention of urine; 2. Cases of impassable stricture uncomplicated with retention; 3. Strictures which, though passable, are complicated with fistulæ or with the existence of foreign bodies, etc., in the bladder; and 4. Cases of traumatic rupture of the urethra, with retention of urine. For the first two classes of cases, Dr. Boeckel recommends the ordinary operation with which we are familiar in this country as perineal section, and which consists in cutting down upon the point of a staff previously introduced and held against the stricture, then working gradually backwards in the median line, with cautious strokes of the scalpel, till the posterior part of the urethra can be detected, and finally introducing upon a director or *urethral gorgeret*, a vulcanized India-rubber catheter which is allowed to remain for a variable period, generally about three weeks; this operation, it will be perceived, differs from Cock's (*Guy's Hospital Reports*, 3d S., vol. xii. p. 273), in that the latter aims to open the urethra *behind* the stricture, which it does not divide, being in fact, as its author terms it, "tapping the urethra at the apex of the prostate, unassisted by a guide-staff." For Dr. Boeckel's third class of cases he recommends Syme's operation or a modification of it; it is a much simpler proceeding than the operation without a guide, and also, we may add, more successful in its results: in cases complicated with the presence of a foreign body in the bladder, it can readily be changed into an operation of median lithotomy. With regard to cases of traumatic rupture of the

urethra, Dr. Boeckel justly observes that if a catheter can be promptly introduced, nothing further will be required; but if this be impracticable, immediate external urethrotomy, which he calls a "new practice," offers the best chance; in reference to this point we would invite our readers to refer to vol. xix. of the first series of this Journal (No. for February, 1837, page 392), where they will find a full discussion of this matter by the editor of the Journal, with an interesting collection of cases, a perusal of which, we think, will induce them to look upon Dr. Boeckel's proposition as, though unquestionably sound, not quite so new as he supposes it.

Dr. Gouley's pamphlet, which is a reprint from the *New York Medical Journal* for August, 1869, appears to be a kind of *avant-courier* of a more elaborate production which is promised in the future. Dr. Gouley introduces a capillary probe-pointed whalebone bougie through the stricture, and upon this as a guide passes a "No. 8 grooved metallic catheter, with a quarter of an inch of its extremity bridged over so as to convert the groove into a canal, the bridged portion itself being also grooved. To insure the incision retaining the median line, Dr. Gouley adopts Mr. Avery's plan of passing a loop of silk through each edge of the incised urethra, close to the face of the stricture, these loops being held by assistants, and serving as landmarks by which the surgeon may *orient* himself (to quote an expression of Dr. Boeckel's) at each step of the operation. The stricture is divided on the whalebone guide with a small knife modified from that of Weber for slitting the canaliculus. Finally the grooved catheter is carried over the guide into the bladder, and the flow of urine shows that the operation is completed. If difficulty is experienced in introducing the guide, from the existence of a false passage, Dr. Gouley directs that one guide after another shall be inserted till the false passage is filled up, when at last one will enter the stricture. It is better (as recommended by Sir Henry Thompson) to fill the urethra with oil, before introducing the guide, than to rely merely upon the application of oil to the latter. Dr. Gouley further recommends that after the operation no instrument should be left in the bladder, but that the surgeon should content himself with passing on the second day, and afterwards every third day "a full-sized, highly-polished, conical steel sound."

Dr. Gouley gives in a table the details of twenty-five cases in his own practice, which resulted as follows:—

Perineal section without guide, . .	11	cases,	no	deaths,
do. with capillary guide, .	10	"	3	"
Syme's operation, ...	4	"	1	"
Total,	25	"	4	"

or a total mortality of 16 per cent.

Dr. Gouley adds that he has a record of 345 operations by American surgeons (233 being without a guide) with but 41 deaths, a mortality of about 12 per cent.—so small a figure that we cannot resist a suspicion that some of his informants have forgotten to mention their fatal cases.

Dr. Boeckel's tables, from French and German sources, give a total of 75 operations with 16 deaths (21⅓ per cent.). Of these, 35 are known to have been without guide, and gave 8 deaths (nearly 23 per cent.), and 12 are known to have been done with a guide, giving 2 deaths, or 16⅔ per cent.

We have read both Dr. Boeckel's and Dr. Gouley's pamphlets with much interest, and consider them particularly well timed just now, as advocating the more frequent employment of an operation which we believe to be a very good one, but which has of late years been rather out of favour with the majority of surgeons. Of course, the operation with a guide is preferable where it can be practised, and Dr. Gouley's ingenious plan of securing an entrance through the orifice of the stricture is certainly worthy of a trial; with regard to the benefits to be derived from retaining or not retaining a catheter after the operation, further experience is, we think, needed; we have ourselves always kept an instrument in the bladder for some days after the operation, not with a view of preventing the contact of urine with the wound, for this cannot be helped; but because we have found the introduction of the instrument during the

inflammatory stage of the operation wound, both troublesome and painful; still the testimony brought forward by Dr. Gouley to the advantages of his plan, is so strong, that we shall be much tempted to follow his advice in the next case that may come under our care. J. A., JR.

ART. XXVI.—*De la Résection Coxo-femorale pour Carie.* Thèse pour le Doctorat en Médecine, par RICHARD GOOD, Docteur en Médecine, etc. 4to. pp. 112. Paris, 1869.

On Excision of the Hip-joint for Caries. By RICHARD GOOD, M. D., etc.

THIS essay or thesis, which is really one of much interest, is divided into six chapters, to which are added an appendix of cases and a bibliographical list of previous monographs or other writings on the subject. We purpose to give our readers a short analysis of Dr. Good's work, and then to give a summary of the statistics which he has collected, together with those which we ourselves have published in the second volume of the *Pennsylvania Hospital Reports.*

After some preliminary remarks, in which Dr. Good says that his researches are meant as supplementary to the labours of M. Le Fort, whose memoir on hip-joint excision was read to the Academy of Medicine in 1860, and published the following year, our author gives in his first chapter a very good historical account of the introduction of this operation into surgical practice, particularly in reference to the difficulties which its advocates have had to contend with in France. The chapter terminates with a carefully prepared table of 112 cases which have occurred since 1860, and which the author has collected from a variety of different sources. In comparing the statistical results deduced from a study of this table with those furnished by other writers, it is to be observed that all the cases classed by Dr. Good as recoveries, are such as have got entirely well, without even a single fistulous opening remaining. Hence the proportion of cures is smaller in Dr. Good's tables than in those which admit as recoveries cases in which superficial openings still exist. The 112 cases of the table are all terminated; besides these, the author has collected 21 others, of which 5 recovered with fistulæ, 7 were still under treatment, and 9 are simply said to be "not cured." Dr. Good's second chapter gives an analysis of his table, and from it we quote the following particulars: Of the whole number (112 cases), 52, or 46½[1] per cent., recovered, and 60, or 53½ per cent., died. Difference of sex appears to exercise little or no influence on the result of the operation, there being but a fractional percentage in favour of males. The mortality of the operation in different countries is as follows: France, 86 per cent.; Russia, 67 per cent.; Germany, 65 per cent.; America, 45 per cent.; and England, 34 per cent. The average age in the successful cases was 11½ years, the youngest patient being a boy of 2, and the oldest a woman of 58. The average age in the fatal cases was 14, the youngest patient being 3, and the oldest 40.

The mortality according to age was as follows: From 2 to 12 years, 41 per cent.; from 12 to 20 years, 60 per cent.; over 20 years, 76 per cent. Of the 60 fatal cases, 10 died in the first week, and 26 in the first month. The chief causes of death were exhaustion (22), phthisis, etc. (10), pyæmia (5), pelvic caries, etc. (4), and diarrhœa (3).

In 29 cases the supposed cause of the disease was noted: in 20 it was attributed to a fall, in 4 to the effects of cold, in 1 to a wound, and in only 4 to constitutional predisposition. The average duration of the disease before operation was twenty-seven months. Nine cases in which the disease was acute, having lasted less than seven months, gave 7 deaths (78 per cent.), while 30 chronic cases (more than two years' duration) gave but 10 deaths (33 per cent.). The

[1] Dr. Good's percentages are all carried out to two figures of decimals, but in quoting them we have usually taken the nearest unit, above or below.

head of the femur had undergone spontaneous luxation in 17 cases, of which only 6 died (35 per cent.), while there was no luxation in 93 cases, which give 52 deaths (56 per cent.). Cases where the acetabulum was healthy gave a mortality of 50 per cent., and cases where it was diseased a mortality of 54 per cent. As far as this point was noted, Dr. Good's tables show a more favourable result where the acetabulum is gouged than where it is let alone. The mortality where the great trochanter was left was 61 per cent.; where it was removed, only 48 per cent. In 42 of the 52 recoveries the preserved limb is known to have been more or less useful; in 19 cases the patient could walk alone, and in 9 with the aid of a single cane. The movements of the new joint were restored in 28 cases, while anchylosis occurred only once.

The percentage of mortality given by Dr. Good is higher than that given by any other writer, and the reason for this is, he says, because his tables include the French cases which have been very fatal, and because some of his cases have been traced for many years to a fatal termination, when in other tables they would have been merely classed as undecided. To estimate the comparative advantages of excision over expectant treatment, Dr. Good refers to the thesis of M. Gibert, published in 1859, which gave an account of twelve cases of hip-disease with suppuration, treated without operation, of which but one recovered, while eight died. Hence Dr. Good places the mortality under expectant treatment at 89 per cent., as compared with a death rate of 52 or 53 per cent. for excision. He concludes the chapter in the following words: "Suppurative coxalgia is a serious malady, which usually ends in death. Resection does not give a very favourable result, but it saves life 46 times in 100, and, moreover, leaves the patient a limb much more useful than could be done by any other treatment."

Chapter III. is called "Indications and Contraindications." Among the circumstances favourable to the success of the operation may be mentioned the absence of organic disease or morbid diathesis, whether inherited or acquired; the limitation of the disease to the head of the femur, when this can be ascertained; the existence of spontaneous luxation; and a chronic course of the disease. The most favourable age for the operation is from three to twelve years, and the proper moment for intervention when an articular abscess has opened externally and has left persistent fistulæ. The chief contraindications are the existence of phthisis or scrofula, great exhaustion of the patient, adult age, or great extent of osseous lesion; if a large portion of the femur be affected, Dr. Good advises amputation in preference to excision. Pelvic abscess is not necessarily a contraindication, and may be evacuated through the acetabulum, as practised by Hancock and Barwell.

Chapter IV. treats of the various operative procedures, of which Dr. Good considers the best to be the simple linear incision behind the trochanter, and Chapter V. is devoted to the after-treatment. For this Dr. Good recommends an apparatus devised by Mr. Barwell, but which differs from the one which is figured in that surgeon's work on *Diseases of the Joints*, in being hinged so as to allow abduction of the limb, and in making counter-extension from the axilla, and not from the groin. Dr. Good lays much stress upon the advice of Heyfelder that passive motion should not be begun for six or eight weeks after the excision, and reprobates the practice of other surgeons who begin such movements as early as the eighth day.

Chapter VI. treats of the results of the operation as regards the limb. Dr. Good's tables give but one instance of anchylosis, which he agrees with most writers in considering as less desirable than ligamentous union. Under the heading of "Utility of the Limb," Dr. Good gives a description, with two figures, of Dr. Sayre's operation for anchylosis of the hip-joint, an operation which our author considers to be in no degree an imitation or modification of Dr. Barton's. The shortening of the limb, in the cases collected by Dr. Good, was noted in thirty-five instances, the least amount being half an inch, and the greatest four inches. The observations of Flourens, Humphrey, and others are referred to, as showing that the growth of the femur is principally from its lower epiphyseal cartilage, and that excision of the hip is therefore less apt to be followed by shortening than excision of the knee.

Finally, comparing our author's statistics with those published by ourselves, we find 66 cases included in both tables; with regard to some of these, however, Dr. Good's researches furnish additional information. We have therefore to add to the 242 cases which we ourselves collected, 46 from Dr. Good's table, together with 10 out of 21 which he has collected but not tabulated, the remaining 11 being already included in our own tables. Four of these 10 were recoveries, though with fistulæ, while the results of the other 6 cases were undetermined. We have then a total of 298 cases, in 246 of which the results are known. The total number of recoveries (including those with fistulæ) is 130, and the total number of deaths 116, being a mortality of 47.15 per cent. of terminated cases, or of 38.93 per cent. of all cases submitted to operation. The death-rate for different ages, and the comparative results of partial and total excision, will appear from the following tables:—

Age.	Recovered.	Died.	Result undetermined.	Total.	Mortality per cent.	
					Of terminated cases.	Of whole number of cases.
Under 5 years . . .	9	7	1	17	43.75	41.18
Between 5 and 10 years	51	23	15	89	31.08	25.84
" 10 " 15 "	39	25	16	80	39.06	31.25
" 15 " 20 "	11	15	1	27	57.69	55.56
" 20 " 30 "	10	17	3	30	62.96	56.67
Over 30 years . . .	2	11	1	14	84.61	78.57
Age not stated . . .	8	18	15	41	69.23	43.90
Total	130	116	52	298	47.15	38.93

Form of excision.	Recovered.	Died.	Result undetermined.	Total.	Mortality per cent.	
					Of terminated cases.	Of whole number of cases.
Total excision . . .	58	44	12	114	43.14	38.60
Partial " . . .	20	17	...	37	45.95	45.95
Form not stated . . .	52	55	40	147	51.40	37.41
Total	130	116	52	298	47.15	38.93

It is thus seen that the mortality of hip-joint excision is least between the ages of 5 and 10 years, and after 15 years rises very rapidly, so that in adult life the operation becomes one of very great risk, probably quite as much so as hip-joint amputation, of which the death-rate is estimated at 58.56 per cent. for all cases occurring in civil practice and at all ages. The second table shows that total are rather more successful than partial excisions, and if those cases where this point is not indicated be considered as partial excisions, the difference will still be maintained; the mortality percentages being then 43.14 against 50 for terminated cases, and 38.60 against 39.13 for all cases submitted to operation; an unanswerable argument, it seems to us, in favour of freely gouging the acetabulum whenever it is found diseased.

In taking leave of Dr. Good's essay, we would recommend it to the attention of those of our readers who are interested in surgical statistics, as a valuable contribution to the literature of its subject. With this volume and Dr. Otis's splendid *Circular No.* 2, which we reviewed in the last number of this Journal, we may fairly suppose that, for the present, to borrow a Gallicism, the "last word" has been spoken on excision of the hip-joint. J. A., JR.

ART. XXVII.—*Miscellaneous Contributions to the Study of Pathology.* By JOHN W. OGLE, M. D., Physician and Lecturer on Pathology, St. George's Hospital, London. 8vo. pp. 72.

THIS interesting paper, originally published in the *British and Foreign Medico-Chirurgical Review* for January and April, 1868, contains the history of nineteen cases of fatal chorea, sixteen of which were treated in the wards of St. George's Hospital, and also some facts in regard to eighty non-fatal cases, all of which, with only two exceptions, occurred in Dr. Ogle's out-patient practice at the hospital, and which, for the sake of convenience, are arranged in a tabular form. There is, in addition, reference more or less full to many other cases, so that the material which the author had for the preparation of his paper is exceedingly abundant, a fact which renders his conclusions very valuable and reliable. Chorea is, moreover, so seldom fatal that we have reason to congratulate ourselves that it has fallen to the lot of so competent an observer as Dr. Ogle to make and record the results of the autopsies of so large a number of cases.

The following are the lesions which were noticed in Dr. Ogle's own cases: Congestion more or less complete of the nervous centres (brain, spinal cord, or both) in six cases; softening of the brain in one; and of the spinal cord in one; other diseases of the spinal cord in one; congestion and other graver lesions of the genital system in five cases; congestion of the peritoneum in one; fecal accumulation in two; fibrinous deposit or granulations upon some portions of the valves of the heart or its lining membrane in ten, and in two of these, in addition, pericarditis. This condition of the valves was unexpected, as in the histories of only three of these cases is the fact noted, that cardiac murmurs were heard during life. On the other hand, in one of the cases in which no lesion of the valves was detected at the autopsy, there is a record of a distinct double valvular bruit having been heard at one time and then having subsequently disappeared. In two cases the disease occurred in pregnant women.

Sex and age exercise an undoubted influence upon the course of the disease, for of the nineteen fatal cases, no fewer than sixteen occurred in women, and the greater number in patients whose age exceeded that at which chorea is most common.

In Dr. Ogle's sixteen cases, the disease was said to have lasted seven months in one case; six or seven months in one; three months in two; six weeks in two; nine weeks in one; three weeks in two; two weeks in one; ten days in three, and only eight days in one. In three cases there had been a previous attack; in eight fright, or mental emotion of some kind, was supposed to have been the exciting cause; rheumatism was said to have preceded the disease in six cases; and in four others, its pre-existence was inferred from the condition of the valves of the heart. In the three fatal cases (one male and two females), detailed at the end of the book, congestion of the nervous centres was also observed. In one, the spinal cord was soft and pulpy throughout its whole extent. It was sent to Mr. Lockhart Clarke for examination, who made the following report: "The spinal cord was slit through longitudinally; only the lower part of the lumbar enlargement remained entire, and this was not sufficiently hardened to admit of making thin sections. The lower portion of the dorsal region which had been slit through was evidently softened; small fragments examined under the microscope exhibited, however, chiefly an admixture of granules, with some compound granular corpuscles, without any remarkable alteration in the condition of the nerve fibres. This condition resulted, no doubt, from an early stage of softening in which a granular fluid exudation was poured out. Just below the middle of the lumbar enlargement the tissue was perfectly pulpy—of the consistence of cream, and a small portion of this picked out and placed on a slide, with as little disturbance as possible, showed under the microscope scarcely anything but broken nerve fibres mixed with granules and some compound granular corpuscles. Almost every fibre had assumed the form of the well-known globular or oval

masses of myalin or white substance, of different sizes, so that under a low power the arrangement resembled the cellular structure in a section of wood or stem of plant. In the lower part of the lumbar enlargement that had not been slit the gray substance was evidently in a state of disintegration." Pregnancy existed in both the female patients, and it was thought had had much to do with the production of the disease.

From the table containing the eighty non-fatal cases, we learn that sixty-one of the patients were females; that all but fourteen were under the age of sixteen; that the age at which the greatest number of cases occurred was eleven years, and that in only two cases was the age over twenty-one. The right side was affected in twenty-four, the left in twenty, and both sides in twenty-five. In the remaining cases, it is not mentioned whether one side was more affected than the other. In thirty-five cases, no cause for the attack was assigned or suspected by the friends of the patient, and in only five does fright or mental emotion appear to have been the sole exciting cause; but in nine other cases, in conjunction with ascarides, falls, or a quarrel, they are said to have produced the attack. In eight cases chorea affected those who had previously had rheumatic fever; but in only one case with such a history were the cardiac sounds interfered with. In two other cases, in which no rheumatic tendency could be detected, there was a systolic bruit at the base of the heart, and in one at the apex. In five cases it is stated that the catamenia had been scanty and irregular, or over-abundant and too persistent; and in one the attack followed a miscarriage. In three cases, the disease appears to have been hereditary. In twenty-five cases there was a history of a previous attack, and in five of these of two, and in one of several attacks (in only nineteen is it positively stated that there had been no previous attack). The disease had lasted in one case for four years, in one for eighteen years, and in another for six years. In only two is mental derangement spoken of; in eleven, paralysis of some kind was present; in two cases anæsthesia; in two atrophy of the muscles. The pupils were dilated in several cases, irregularly so in five—the right pupil being more dilated than the left in all of them. Pain in the head is spoken of in five cases, spinal tenderness in one, and disordered vision in three. In five cases the irregular movements were said to continue during sleep, and in one they were always worse when the patient was first aroused.

In nine of the cases not tabulated, some curious symptoms are noted. In one the movements are described as "coming on in paroxysms, principally affecting the muscles of the neck, and twisting his head so far around sometimes as to cause him to tumble down, screaming and barking." In another, great hypertrophy of the muscles of the back of the neck was caused by their constant action; and in another, there was constant rotation of the head; and in still another, in which there was a complication of hysteria, the patient rotated around her own axis. In two cases peculiar sounds were uttered, and in one there was loss of speech.

Among the most interesting of the questions discussed, is the relation which rheumatism and fibrinous deposits on the valves of the heart bear to the production of chorea. It is well known that Dr. Kirkes, some time ago, announced his belief that the irregular movements of this disease were due either to obstruction of the cerebral capillaries, or to irritation of the brain itself, in consequence of the circulation through it of an altered blood. This theory has been sustained and, to a certain extent, elaborated by Drs. Tuckwell and Hughlings-Jackson, and is supported by the frequent coincidence of deposits upon the valves of the heart, and local cerebral softening. But Dr. Ogle is unwilling to give it his unqualified approval, and some of the objections which he urges against its universal adoption are certainly forcible. In the first place not even the most ardent of its supporters would deny that there are many cases which cannot originate in this way, and we are, therefore, obliged to arrange cases of chorea in two classes; the first comprising those which depend upon embolism: the second, those which do not—which, as a cardiac murmur is by no means always heard, even in those cases in which after death fibrinous granulations on the valves are found, and as the majority of the symptoms in the two classes present great similarity, if not complete identity, is not an easy task. If embo-

lism, moreover, were a frequent cause of chorea, its manifestations would probably not be so frequently one-sided, or confined to certain groups of muscles. Again, the theory rests, up to the present time, almost upon pure speculation; for, so far as the writer is aware, there are few published observations of embolism of the cerebral vessels in which chorea-like symptoms occurred, in proportion to the number of times that emboli, or the softening induced by them, have been detected in the brain at *post-mortem* examinations. The symptoms, moreover, of this disease, certainly differ from those which are experimentally produced by the introduction into the circulation of minutely divided fibrin.

The sudden occurrence of the disease as a consequence of fright or other mental emotion, and its equally sudden disappearance, its relief by certain remedies, which cannot have the power of dislodging an embolus or preventing its usual effects, and the cessation of the irregular movements during sleep are all regarded as arguments against the acceptance of a purely mechanical theory of its origin. In regard to the deposition of fibrin upon the valves of the heart, Dr. Ogle says that it is probably due to the same condition that produces the chorea, and is not to be looked upon either as the cause or effect of the latter. He, moreover, thinks that rheumatism can scarcely be considered one of the predisposing causes of chorea.

For some of the reasons given above, Dr. Ogle also rejects Dr. Day's theory, that there is "some want of due relation between the bones and the inclosed part of the nervous system, the cavity not corresponding to the increasing marrow, and then a constriction or pressure may for a time produce an irritating effect. J. H. H.

ART. XXVIII.—*On a Case of Death from Hemorrhage into the Pericardium, as a Result of Rupture of one of three true and circumscribed Aneurisms of the Coronary Artery of the Heart; with Observations on Aneurism or Aneurismal Dilatation as a Result of Embolism or Thrombosis.* By JOHN W. OGLE, M. D. 8vo. pp. 22.

THIS paper originally appeared in the second volume of the *St. George's Hospital Reports*, and was very cursorily noticed in the January number of this Journal for 1868, page 195. The patient whose case is reported was a man, aged 26 years, who had had rheumatism twelve years before coming under Dr. Ogle's care, and had latterly suffered from symptoms which indicated embolism of some of the branches of the right brachial artery as well as of some of the other arteries of the body. Six days before admission he had severe pain in the right arm, lasting about an hour. When the pain had left him, he found that he was unable to move his arm and hand. At the time of his admission there was still inability to extend the wrist, together with some numbness in the parts supplied by the ulnar nerve, a patch of ecchymosis on the inner side of the right arm just above the elbow, and much hardness and tenseness of the muscles of the inner side of this arm, extending up into the axilla. The action of the heart was tumultuous, and it was thought by some who auscultated it that in addition to a slight systolic murmur there was an exocardial bruit. The patient died the next day, apparently from syncope. The following is a summary of the results of the post-mortem examination: Slight atheromatous disease of the large arteries at the base of the brain; plugging of the smaller veins on the surface of the posterior lobes of the cerebrum and cerebellum with partially decolorized blood clots; distension of the pericardium by finely coagulated blood; thickening of, and fibrinous deposit in, the aortic valves; aneurismal dilatation of three different branches of the coronary arteries; a large mass of recently extravasated blood in the right kidney, in which was found a cavity which contained blood and was probably an aneurismal dilatation of a branch of the renal artery; and also in the muscular structure of the right arm, corresponding to the patch of ecchymosis, a large mass of extravasated blood which was believed to have proceeded from the rupture of an aneurism of one

of the muscular branches of the brachial artery; other dilatations were found in the neighbourhood, one of which was in close proximity to the median nerve.

The aneurism which had ruptured and given rise to hemorrhage into the pericardial sac was found perforated by a small opening, so that the loss of blood at first was probably a mere oozing, and this view is confirmed by the existence of an exocardial sound before death, which was no doubt caused by the presence of a small amount of blood in the pericardium. It is worthy of remark that in one of the cases referred to in this paper, and originally reported by Dr. Peacock to the *Pathological Society of London* (vol. i. p. 227 of the *Transactions*), a "peculiar flapping sound accompanying the action of the heart, but distinct from the ordinary cardiac sounds, was loudly audible along the course of the sternum and towards the left side," was heard the day before death; but previously no auscultatory phenomenon could be detected. In many of the other cases collected by Dr. Ogle there was nothing to attract attention to the heart until immediately before death, so that a diagnosis of this lesion must at present be impossible. Of the nine cases of which some details are given in this pamphlet rupture of the sac and hemorrhage into the pericardium took place in seven, and this may therefore be regarded as the usual termination, especially as it was also found to have taken place in three cases reported in the number of the *New York Journal of Medicine* for May, 1860, p. 384.

Dr. Ogle sees in this case confirmation of the view which he has long held and sustained, that the formation of aneurisms, especially of the smaller arteries of the body, is very often the result of embolism or thrombosis of the vessel. This valuable pamphlet terminates with a reference to five cases of rupture and dilatation of the cardiac veins, which the author believes to be even rarer than similar disease of the coronary arteries. J. H. H.

ART. XXIX.—*A Practical Manual of the Diseases of Children, with a Formulary.* By EDWARD ELLIS, M. D., Physician to the Victoria Hospital for Sick Children; late Physician to the Samaritan Hospital for Women and Children. 8vo. pp. xiv. 275. London: John Churchill and Sons, 1869.

THIS little book is an appropriate companion to the several large works upon Diseases of Children which have been published during the past year. It contains nothing of clinical record, nor does it enter into the discussion of questions in pathology. Even in regard to treatment it shuns the consideration of methods, and uses such terms as cholagogues and counter-irritants according to their current value, because "the profession attaches to these terms qualities which are true qualities, though old theories of their action may be incorrect." We find no allusion to *progressive myo-sclerosic paralysis* nor to *fatty atrophic paralysis*, but all the more frequent diseases of infancy and childhood are properly noticed in convenient groups. The descriptions are concise and faithful, with sufficient detail to aid efficiently in cases of doubtful diagnosis. The first chapter, upon general management during the first year of life, and diet for children one year old and upwards, will be found useful for ready reference; and the last section contains general therapeutic hints and a copious formulary prepared with especial care. To those who avail themselves of this really excellent "Manual" we extend only one caution—that they do not follow too closely the author's frequent recommendations of antimony in various forms. And whatever view may be taken of the pathological relation of diphtheria to croup, we cannot indorse a therapeutic separation which would employ sustaining remedies in the former, and strongly antiphlogistic ones in the latter affection. The treatment in general advised by Dr. Ellis is good. E. R.

ART. XXX.—*The Jurisprudence of Medicine in its Relations to the Law of Contracts, Torts, and Evidence, with a Supplement on the Liabilities of Vendors of Drugs.* By JOHN ORDRONAUX, LL.B., M.D. 8vo. pp. 310. Philadelphia: T. and J. W. Johnson & Co., 1869.

THE author of this book possesses the unusual advantage, as a writer on Medical Jurisprudence, of having had both a medical and a legal education, and thus is peculiarly fitted for a task requiring more knowledge of law than of medicine. His purpose is to exhibit the rights and duties of physicians and apothecaries, under the law, in some of their relations to the public. He thus supplies a want hitherto completely neglected, for we are not aware of there being any similar work in the literature of our profession. Such a book ought to be highly appreciated by medical men, for it teaches them directly what they can and what they cannot do, in certain relations. They are put in possession of information stored away in innumerable law books, utterly inaccessible to all but regularly bred lawyers. Here, within the compass of a few pages, they may learn their exact status before the law, the pecuniary obligations created by their professional service, their liabilities for malpractice, the nature of skilled testimony, their rights and duties on the witness-stand, the extent of obligations incurred by the rules of associations, and many other incidental matters. The vendors of drugs, and the manufacturing and dispensing pharmaceutists, may also learn their liabilities for dishonesty or imperfection in their respective callings. The book is, essentially, a *résumé* of judicial decisions, the merits of which the author has not always undertaken to discuss. With what degree of fulness and accuracy he has executed his task, it belongs only to a lawyer to say. It struck us, however, that he has been too sparing of original remark, even on points where, without such help, it would be utterly impossible for the reader to learn, amid a host of dissimilar decisions, what really is and what is not the law. Decisions are strung together with so little regard to logical connection, that they must necessarily leave a confused impression on the mind. For instance, the account of the manner in which the expert's opinion is to be elicited, will convey no definite idea to one not previously acquainted with the subject. "In order," he says, "to make the opinions of experts admissible, they must be founded on a given state of facts, which should embrace all the facts relied upon to establish the theory claimed. Wherever these facts are controverted, they cannot be properly considered as affording the witness any opportunity of forming a conclusive opinion; for, as in the case of any other syllogism, if the premises are not admitted the conclusion cannot be drawn absolutely. Hence, experts are not allowed to give their opinions upon the case where the facts are controverted, though counsel may put to them a state of facts and ask their opinion thereon. It is only by a comparison of all the facts in issue that the expert can venture to express any opinion upon them; whence it follows, as a necessary consequence, that expert opinions are admissible if based upon a state of facts which the evidence on behalf of either party tends to establish." In shorter terms, to make the opinions of experts admissible, they must rest on all the facts relied upon to establish the theory claimed; they must rest on no controverted facts, whatever that may mean; next, they must rest on a state of facts which the evidence on behalf of either party tends to establish. This is a sad jumble of things not much calculated to edify the reader. The author may say it is not his fault that decisions are contradictory or impracticable; that he gives them as he finds them, and is responsible for nothing more than their literal correctness. To this we reply that the object of his book is to enlighten his readers, and if he leaves them as much in the dark as before, he has, certainly, to that extent failed of his object. He had better have said, we apprehend, that in some States, as New York and Pennsylvania, the opinion of the expert must be based on all the evidence, supposing it be true. In other States, his opinion must be given, not on the facts in evidence, but on a hypothetical case presented by the counsel. In some cases he has been allowed to consider all the facts as true; in others, he

has been required to leave out of the account all controverted facts. It might have been added that when courts have discarded the old method of requiring the expert to hear all the testimony, and give his opinion on that, supposing it true, they have launched upon a sea of subtleties and refinements, and, after much beating about, generally have brought up very near the place from which they started. The author, however, approves of this course, availing himself of the hackneyed objection, that by the other method of putting the question, the expert is made to assume the functions of the jury. We could never see the grounds of this distinction. To allow the expert to give his opinion on the whole testimony as he has heard it, supposing it true, must have the same effect, essentially, as to require him to give his opinion on an hypothesis embracing those same facts. The difference is much like that between tweedledum and tweedledee. The latter method, however, may thwart rather than serve the purpose for which the expert is called. The court and jury wish from him information respecting the case on trial, whereas, this method allows him to speak about any other case but that. In practice, the counsel make up an hypothetical case to suit their purpose. By putting in some features of the actual case, by colouring some and omitting others, they present a case so nearly like that on trial as to confuse and mislead the jury. If the objections to the old method can be obviated in no other way than this, it had better be retained. Such, in fact, is the opinion of some eminent jurists, Judge Redfield, for instance. (*On the Law of Wills*, 152.)

Our author intimates that the expert *must* give the grounds and reasons of his opinions in order to make them admissible. Of course he must if required, but otherwise, we have often observed, they are allowed to go to the jury for what they are worth. We regret that the author did not improve the opportunity, as every medical man should when he has it, to expose the curious absurdity which characterizes the theory of skilled testimony. The court and jury being entirely ignorant in regard to certain matters of special study and experience, and consequently unable to estimate the significance or force of facts connected therewith, the law permits them to obtain the requisite information from experts, who are required to give the grounds of their opinions, in order that the court and jury may be able to judge for themselves whether they are sustained by the alleged facts. The latter being entirely without skill or knowledge on the subject, they are supposed to be competent to appreciate exactly the relation between the opinion and the facts, and so virtually they become extemporized experts, ready to pass judgment on the opinions of the regularly constituted expert, as if the reasons for an opinion were necessarily intelligible to everybody however ignorant of the subject. We do not imagine that any change, in this respect, will occur during the present generation, but that is no reason why men of science should forego any suitable opportunity to proclaim their conviction, that frequently the rule in question is neither practicable nor necessary.

In regard to the compensation of experts, our author leaves us in doubt whether the expert may insist upon an adequate remuneration. He cites one English authority to this effect, but we apprehend the right of compensation is not universally recognized in American courts. In many, if not most States, the law makes no provision for paying the expert anything more than ordinary witnesses are allowed. For many days together he may be kept from his business, giving to the State the benefit of his learning and experience, and receive for it all hardly enough to pay his tavern bill. As if this were not indignity enough, he sometimes incurs a degree of forensic odium by accepting something like adequate compensation from the party employing him, utterly destructive to the value of his testimony. Of course, lawyers know that a suitable remuneration for professional services does not imply subornation of perjury, but they also know that in the mind of the average juryman it does imply that or something very like it, and with a kind of strategy that seems to be honourable enough at the Bar, they bring out the fact, under the license allowed to cross-examination, with an effect about as damaging to the witness as if he had been shown to be an old convict or an associate of thieves and rogues. We are surprised that the profession have made so little effort to obtain their

rights in this respect. Judicious and persistent action on the part of State Medical Societies and other medical bodies, would finally succeed, we have reason to think, in getting from the Legislature such a law as they now have in Massachusetts, for instance, which provides a proper compensation to experts for services rendered to the Commonwealth. With such a law, counsel would hardly expect to damage the credit of an expert employed by a private party by asking how much he is to receive.

The tendency of the times to remove restrictions upon the practice of medicine, joined with another tendency not less strong, to increase the measure of responsibility incurred by the practitioner, has led to decisions from which it is impossible to extract anything like definite and settled rules. Of one thing, however, there can be no doubt, and that is that the physician of the present day is at the mercy of every ill-natured patient who, imagining that he had not received from his services all the benefit he had a right to expect, avails himself of the chances of litigation to turn his disappointment to some profitable account. Very naturally, therefore, some of them have thought of protecting themselves against this kind of injustice by means of an immunity bond. Our author thinks, upon the strength of general principles, that such a covenant would avail the physician nothing, in law, although he cites no decision to that effect. We presume he is correct in this opinion, though not for the reason he alleges, "that it is against that spirit of equity which should regulate the transactions of mankind, to allow any one to contract for exemption from the legal consequences of his own wrongful acts; and to no other acts do legal consequences, in the nature of penalties, attach." It is an abuse of terms to call an act wrongful which was accompanied by due care and an ordinary degree of skill. A jury may call it so, in defiance of every principle of justice and common sense, and, therefore, it seems to us, the medical man may resort to any measure of protection which the law allows, without thereby effecting any "derogation of his dignity," or attempting "to pervert the equitable streams of jurisprudence," or evincing "no confidence in his own skill."

In following a tangled thread of judicial decisions, Prof. O. sometimes loses sight of their relations to one another, and the reader is left with a very confused idea of what it all means. Thus, on the custody of the insane, he says: "The general principle is everywhere recognized, that however insane a party may be, no one has a right to confine him for *an indefinite period*, except by due process of law." In support of this statement, he gives the decision of Chief-Justice Gilchrist, of New Hampshire. And yet this is directly followed by a long extract from Chief-Justice Shaw's decision in the Oakes case, maintaining the opposite principle. "These views of Chief-Justice Shaw's," he continues, "were fully confirmed by the Supreme Court of Pennsylvania in the case of *Hinchman* vs. *Richie*," and there the matter ends. If the reader, after finishing this chapter, has any clearer idea of what the law actually is on this subject, we can only say that he is endowed with a force of penetration to which we can lay no claim. A more intelligible account of the matter, and certainly more conformable to fact, would have been to say that the rule of law respecting the confinement of the insane, depends solely on the caprice of the judge.

The extreme division and subdivision of medical practice into specialties, have introduced much confusion and uncertainty into the law respecting the qualifications of experts. The time has gone by when every doctor was unhesitatingly admitted as an expert in any question of medicine or surgery; but the time is yet to come when the limitations incident to the change in question, shall be exactly defined. Our author gives us but a glimpse of the diversity of opinion on this subject, and the medical reader who pursues his inquiries no further, will hardly be certain that, if called to the witness-stand, he will be allowed to testify respecting ovarian disease unless he has performed as many operations as Dr. Atlee, or a question of insanity without having as many insane under his charge as Dr. Kirkbride. On these points, the legal profession are at present in a muddle, not so fully exhibited by our author as it might have been without wearying the reader. It is a fact worth knowing, for instance, that while in Massachusetts any educated practitioner is competent to express an opinion as an expert on a medical question, the rule is accompanied

by this reservation, as expressed by Judge Thomas in *Baxter* vs. *Abbott*, 7th Gray, 71, that "the difference is rather in the weight of testimony than in the competency of the testimony." This simple rule, while it sweeps away all the existing difficulties, is founded in common sense and common experience, and is worthy of universal application. A man who has received such a medical education as is now furnished by the regular schools, may be presumed to have some degree of knowledge on all current medical topics. Whether he has had the means of knowing as much as his neighbour, about certain branches of his art, and therefore as competent to express an opinion thereon, is a question very easily settled.

We have a right to complain, too, of the meagreness of the chapter on the mental capacity to make a will. Probably in the whole round of medical jurisprudence, there is no subject with which the physician is more likely to be placed in some legal connection than this. On his knowledge of what the law requires, and on his judgment and discretion, may depend the peace of families and the disposition of property. The amount of wrong to which he may become accessory in advising his patient to make a will, can be equalled only by the mischief that may ensue from the opposite advice. Unless he has his wits about him, quickened by proper information concerning his duty, he will be likely to err on one side or the other. Instead of the three or four pages devoted to this subject, in which he cites not a single decision, he might have given forty or fifty pages, and still preserved the proper proportions of his book. We are happy to say, however, that on one of his few pages may be found a more intelligent apprehension of the real merits of the case than many a judicial decision would furnish.

"The phrase *a* will, conveys no idea, in strict signification, of the mental qualifications indispensable to its validity, any more than the words oration, history, or poem. Because a man is able to speak, it does not follow that he can make an oration; or because he can tell an incident, that he can write history; or because he can make a rhyme, that he can produce poetry. Capacity to make *a* will may imply very different and opposite states of mental power; for it may mean either the ability to make a simple bequest, as, for example, *I give my watch to A. B.;* or it may mean ability to recollect and comprehend the contents of many pages of paper, reciting, besides simple bequests, trusts of various kinds, devises over, contingent remainders, provisions to meet the possibility of issue extinct, and all that the fertile ingenuity of counsel may invent. To ask any subscribing witness or medical expert, before hearing such an instrument read, whether the testator had mental capacity enough to make *a will*, meaning *any* will, simple or complex, is asking them the most ambiguous of questions. For, in contesting the probate of any will on the ground of mental incapacity, the issue is not whether the testator could have made a will in general, or any kind of a will, but whether he had capacity enough to make *the* particular will in question; and until the witnesses or experts know the character of the instrument, so as to be able to appreciate the mental capacity necessary to comprehend the purport of its provisions, it is plainly beyond their power to answer the question in whatever form it may be put."

What a contrast between the principle here so clearly and forcibly expressed, and the arbitrary tests of the old lawyers and the discrepancies and contradictions of their successors, compared with which the "confusions of science," as they are pleased to style an intelligent diversity of opinion among scientific men, dwindle into insignificant dimensions!

In conclusion, we venture to assure Professor O. that if he should resume his labours in a field on which he has barely entered, as we trust he will, he need not fear to make a freer use of his materials, while we would also suggest that a little more care bestowed upon their orderly and skilful arrangement would be duly appreciated by the reader. I. R.

ART. XXXI.—*Transactions of American State Medical Societies.*

1. *Transactions of the Vermont Medical Society for the years* 1867 *and* 1868. 8vo. pp. 96.
2. *Proceedings of the Convention for the Organization of the Nebraska State Medical Society, held in Omaha June* 24*th*, 1868. 8vo. pp. 28.
3. *Transactions of the Medical Society of the State of Pennsylvania at its Twentieth Session, held at Erie, June*, 1869. 8vo. pp. 310.
4. *Proceedings of the Georgia Medical Association, at the Session of* 1868, *held at Augusta* (Reorganization meeting). 8vo. pp. 20.
   Transactions of the Twentieth Annual Meeting of the Georgia Medical Association, held in the City of Savannah, April, 1869. 8vo. pp. 50.
5. *Transactions of the Nineteenth Anniversary Meeting of the Illinois State Medical Society, held in Chicago, May*, 1869. 8vo. pp. 160.
6. *Transactions of the Medical Association of the State of Alabama; Annual Session*, 1869. *held in Mobile, March; with Proceedings of a Meeting held for Reorganization, in Selma, March*, 1868. 8vo. pp. 144.
7. *Minutes of the Proceedings of the South Carolina Medical Association, at the Meeting convened in Charleston for the purpose of Organization, May*, 1869. 8vo. pp. 18.
8. *Minutes of the Thirty-Sixth Annual Session of the Tennessee Medical Society, held at Nashville, April*, 1869. 8vo. pp. 18.
9. *Transactions of the Indiana State Medical Society at its Nineteenth Annual Session, held at Indianapolis, May*, 1869. 8vo. pp. 70.

1. AT the semi-annual session of the *Vermont Medical Society*, held June, 1867, an address was delivered by the Vice-President, Dr. H. D. HOLTON, introducing as topics for consideration, "Medical Education," under which head, among other matters, was included the necessity of some designation by which the standing of a scientific and regular physician can be marked; the initials M. D. being assumed by irregular practitioners of every grade. The subject of criminal abortion was next considered; the alarming increase of the crime referred to; its dangerous effects on population, and upon the health and morals of our females. His next theme was insanity in women, which is so frequently the result of uterine derangement. Necessity of improved facility in our asylums for the insane was indicated. There is a risk of conducting, in such cases, the proper examination, arising from the perverted imagination of the patient, hence the suggestion that there should be a board of consulting examiners for each Asylum, to be called in when deemed necessary by the Superintendent.

The address of the retiring President, Dr. WARNER, at the Annual Session held October, 1867, was principally devoted to historical reminiscences of quackery, and a brief reference to the quack nostrums of the day.

The theme of the address of the President, Dr. C. P. FROST, delivered at the Annual Session October, 1868, was "The Past and the Present of Medical Science." The subject is very well handled, and the sketch of the rapid progress which scientific and practical medicine in all its branches has made within the present century, is interesting and instructive.

The several reports and papers presented at length in the present volume of Transactions, evince on the part of their respective authors no little research and observation, conferring credit upon the Society, and upon the medical profession of the State generally.

The essay on "Pyæmia from Gunshot Wounds," by Dr. M. GOLDSMITH, late Surgeon U. S. A., is full and elaborate. He infers after a very careful examination of the subject that the constitutional state termed in medical parlance, pyæmia, is in fact a *septicæmia*, resulting from the admixture with the blood of some putrescent substance generated in the body or absorbed from without.

An account is given by Dr. S. T. BROOKS, of a "Case of Pyæmia from Suppurative Inflammation of the Right Lateral Sinus following Chronic Disease

of Cavity of Tympanum and Mastoid Cells, a sequel to Scarlatina." The case is a highly interesting one, but points to no positive practical result.

A very sensible paper is contributed by Dr. C. P. FROST on "Puerperal Eclampsia," but it sheds no new light upon the causation, prevention, or treatment of the disease.

A case is related by Dr. E. H. PETTENGILL, of "Chronic Diarrhœa cured by the use of Strychnia," which has several points of interest. It occurred in a male aged thirty-seven years, after active treatment for some spinal affection. It yielded only for a short time to the usual remedies, then recurred to the same extent as before; the patient was then put upon the use of strychnia; for several days there was but a very slight appearance of the tetanic symptoms characteristic of the specific action of the article. In the course of four weeks he took 7½ grains of strychnia; he could go now without any disturbance of bowels for some twenty-four to thirty hours. After the lapse of 10½ months he was perfectly well of all bowel complaint.

A very curious instance of the occurrence of "Six Cases of Cataract in one Family," is related by Dr. C. M. RUBLEE.

In a paper by Dr. L. C. BUTLER is presented a very cautious inquiry into the "Decadence of the American Race," as shown by the Registration Reports of Massachusetts, Vermont, and Rhode Island, with its cause and remedy. The fact of the decrease in the progeny of the native stock in the New England States appears to be well established, but in accounting for this decrease, we suspect that too much influence has been ascribed by Dr. B. to the, it is true, fearfully increasing crime of fœticide.

The concluding article is a very succinct paper by Dr. A. HARDING, on the "Topography and Diseases of Grand Isle County."

2. *The Nebraska State Medical Society* was organized at Omaha, June 24th, 1868. Of the *Transactions* of the first regular meeting of the Society held in June, 1869, we have seen no account. We feel desirous of an opportunity to test their value.

3. The annual address before the *Pennsylvania State Medical Society*, by the President, Dr. JOHN CURWEN, is devoted to the consideration of the importance of the study by every physician, of the different forms of mental disturbance, their diagnostic signs, their causes, and their moral, hygienic, and therapeutic management. His observations are particularly interesting, being based throughout upon correct views as to the nature of mental derangement, of its etiology, and of the remedial means best adapted for its successful management, as deduced from its clinical study.

Preceding the annual reports from County Medical Societies, we are presented with several reports from special committees, appointed at a former session of the Society.

The *first* of these is on "Intemperance as a Disease." Though by no means as full and complete as the importance of the subject would seem to demand, still the report presents some sound views, which lead to valuable practical deductions.

The *second* report is from the Committee on "Admission of Patients into Insane Hospitals," appointed to procure the enactment by the Legislature of a law establishing the relations of the insane, so as to protect the medical profession in giving certificates of insanity, the insane from improper influences, and the community at large from injustice and oppression. The report states that a memorial to that effect, with the draft of a law, was prepared and presented to the Legislature. The law was passed, but with two additional sections, which the committee consider as particularly objectionable.

The next report is from the Committee on "Inspection of Drugs." The Committee report that they had failed in their efforts to induce the Legislature to enact a law having for its object such a regulation of the business of the druggist and apothecary as will insure to the physician that his prescriptions shall be skilfully and accurately compounded, and of pure and efficient materials.

The *fourth* report is from the Committee on "The Training of Nurses." It

is by Professor S. D. GROSS, of Philadelphia, being in substance the same as that on the same subject read by him before the American Medical Association at its Session in June, 1869.

The *fifth* and last of these special reports is on the "Use of Alcoholic Stimulants by the Medical Profession," as a remedy in the treatment of disease. It presents the subject in a point of view well calculated to attract the serious attention of every medical practitioner.

In addition to the special reports, there is the history of a case of "Rupture of the Uterus," by Dr. J. MCCONAUGHY, which, however, illustrates no special point in regard to the accident itself, nor to its proper treatment.

Dr. BENJAMIN LEE, of Philadelphia, next describes "A New Instrument for the Treatment of Lateral Curvature of the Spine."

The concluding portion of the volume before us comprises the reports from County Societies.

From only sixteen counties were reports, correctly speaking, received. For the most part, these are incomplete and unsatisfactory, being confined to the medical history of particular, often very circumscribed, districts of the county from which they purport to emanate, while even these mere local histories are too generally couched in loose, general, and unsatisfactory terms. Still, with all their deficiencies, the reports received are not devoid of interest or of actual practical value.

So far as regards the general health of those portions of the State which the reports before us represent, during the twelve months preceding June, 1869, everything is favourable. There occurred, we are told, no wide-spread epidemic, and the few that did occur, besides being of very limited extent, were mild in character, and attended by a comparatively slight amount of mortality, and the same state of things very nearly prevailed, as we are assured from other sources, throughout those portions of the State from which no reports were received by the Society.

4. The annual address of the President of the *Georgia Medical Association*, (Dr. L. A. DUGAS), April 1869, comprises many judicious remarks in respect to the importance of the association of medical men, as a means of advancing the general fund of professional knowledge, by adding to it new materials, in the form of facts derived from individual experience, and by enabling us to compare the results of the clinical observations of each member upon mooted questions of interest in respect to etiology, pathology, or therapeutics. But we differ entirely from Dr. D., in his estimate of our code of ethics. No one of the provisions of the code can become a cause of estrangement between high-minded, intelligent, and honourable members of the profession. The exclusion of the *unworthy* from professional intercourse with physicians of an opposite character, for which Dr. D. condemns the code, is with us one of its chief recommendations. In no other way can the dignity and moral efficiency of the profession, and the harmonious co-operation of its members in the promotion of the best interests of society at large be so certainly secured.

The reports made at the twentieth annual meeting of the Association were (A) one from a committee appointed at the 19th Annual Session to prepare an address to the public on the "Relation of Charlatans and their Nostrums to Legitimate Medicine." This address is well intentioned, but we very much doubt its authority for the assertion that "to the *dignified* silence (so called) of the profession, the rapid spread of the evil of quackery, is in great part to be attributed." We fear that, with an ignorant public, the reiterated denunciation of quackery and of its nostrums by physicians has been received, to some extent at least, as an evidence of the efficacy of the latter.

A very sensible report (B) was presented by Dr. T. S. POWELL on "Medical Education," in which the recommendation of a course of preparatory instruction in primary Medical Schools made by the *American Medical Association* (session of 1858) is indorsed.

The next report (C) is on the "Importance of the Thermometer to the Physician in his Daily Practice," as a means of diagnosis and prognosis.

5. At the 19th anniversary meeting of the *Illinois State Medical Society*, May, 1869, the following reports were received: 1st. "On Obstetrics," by Dr. H. B. Buck. This able and interesting report is composed mainly of well-described cases of a highly practical character. The first of the series of cases, two in number, is of *dysmenorrhœa*, in one attended with convulsions; a somewhat remarkable case of *miscarriage;* a case of *uterine hydatid*, simulating pregnancy; case of *prolonged retention of a dead fœtus;* case of *ruptured uterus*, with recovery and subsequent pregnancy; case of *an anencephalous fœtus;* six cases of *anomalous labour;* three cases of *placenta prævia;* a case of supposed *latent metritis*, consequent upon suppressed lochia and resulting toxæmia; a case of *atresia vaginæ*, occurring in an infant three months old; a case of *abortion* at four months, followed by premature delivery of a second fœtus, at the seventh month; a case of *traumatic atresia* occurring in a married woman, twenty years of age, during her first pregnancy.

The 2d report, by Dr. N. S. Davis, is on "Drugs and Medicines." Dr. D. alludes to the rapidly increasing tendency on the part of pharmaceutists to prepare and urge upon the profession and the public, proprietary compounds—elixirs, concentrated powders, fluid extracts, etc., and points to the evils which necessarily result therefrom. In relation to new remedies Dr. D. briefly notices purified opium, svapnia, sweet quinine, carbolic acid, peroxide of hydrogen, ozonic ether, and leaves of the chestnut tree.

The 3d report is that of the "Committee on Insanity," to which was submitted the question: What legislation, if any, is necessary to secure the rights and comforts of the insane previously to their admission to hospital care and treatment?" The committee present a short review of existing laws, with the project of a law designed more fully to determine certain relations of the insane; in order to promote the ends of justice, and to enforce the claims of an enlightened humanity. It is the project unanimously adopted by the *Association of Medical Superintendents of American Institutions for the Insane*, at its annual meeting, June, 1868.

The 4th report is on "Staphyloraphy," by Dr. M. Gunn. The various surgical operations that have been performed for the closure of cleft-palate are described, and their results impartially reviewed.

The 5th report is that of the Committee on "Practical Medicine," by Dr. E. P. Cook. It is very full, able, and instructive, as is also the valuable "supplementary report" from the same committee, by Dr. D. L. Jewett. Among much that is of a highly interesting character we have, in the report of Dr. Cook, a very full account of the etiology, pathology, march, termination, and best plan of treatment of a disease which has prevailed during several years past in vicinities where the soil is wet and composed of a deep alluvial deposit, not only in Illinois, but in other portions of the United States, and has received the name of *typho-malarial fever*. Dr. Cook considers the disease as in fact typhoid or enteric fever very much modified by malarial and scorbutic influences. In the supplemental report Dr. Jewett gives an account of epidemics of scarlatina and measles that had fallen under his observation.

The 6th report, by Dr. J. S. Hildreth, is on "A method of Increasing Success in the Extraction of Cataract."

The 7th report, by Dr. E. Ingals, is on "Lenient Medication." It is marked throughout by sound views in respect to the modifications and ameliorations which our general system of therapeutics has undergone of late years.

The report on "Aphasia," by Dr. H. M. Hurd, is illustrated by a number of apposite cases.

The report by Dr. E. L. Holmes presents a "Statistical view of Diseases of the Eye, with a Table of Operations; the necessity of Position in the Treatment of Chloroform Poisoning, and a notice of Sympathetic Ophthalmitis."

The report of the Committee on Necrology closes the volume.

6. The Transactions of the *Medical Association of the State of Alabama*, at its session of 1869, were opened by a neat and interesting Address from the President, Dr. A. G. Mabry, on the History of Medicine, particularly in reference to the State of Alabama.

This is followed by a very full and satisfactory report by Dr. R. F. MICHEL, on "Hemorrhagic Malarial Fever." A malignant malarial disease, following repeated attacks of intermittent, characterized by intense nausea and vomiting, a very rapid and complete jaundiced condition of the surface, as well as of most of the internal organs of the body; an impacted gall-bladder, and hemorrhage from the kidneys. These phenomena present themselves in an almost uninterrupted connection, attended by remissions and exacerbations: the disease is one peculiar to the Southern States. It has received various synonyms, as Black Jaundice; Cachemia Hæmorrhagica; Malignant Congestive Fever; Icterode Pernicious Fever; Purpuræmia; Yellow Remittent; Yellow Disease; Canebrake Yellow Fever, etc.

Next follows a valuable paper on "Embolism," by Dr. S. D. SEELYE.

The reports from different portions of the State are, in general, well drawn up, and present a useful history of their condition in respect to the amount and character of the diseases prevailing in particular sections of each. Dr. G. A. KETCHUM, Chairman of the Committee on the Diseases of Mobile, remarked that in the latter place, during the year 1868, there had not occurred any endemic or epidemic disease of extended prevalence or of much severity; the health of the city being so good as hardly to furnish matter for a report. He related instead a case of hemorrhagic malarial fever, with pathological and therapeutic comments. Dr. MCDANIEL presented an elaborate report on the diseases of Wilcox County. A large portion of which related to a severe epidemic of hemorrhagic malarial fever, with a full account of its symptoms and treatment. The report on the diseases of Dallas County was read by Dr. W. P. REESE. A large portion of it was devoted to hemorrhagic malarial fever, or, as Dr. R. preferred to name it, *Malignant Jaundice*. An essay on the disease was also furnished by Dr. B. H. RIGGS, who prefers to call it *Purpuremia*. Dr. FURNESS read a report, prepared by Dr. MABRY, for the *Selma Medical Society*, which treats chiefly of the hemorrhagic form of malarial fever. Dr. KUMPÉ read the report of the Committee on the Diseases of North Alabama, entering with some detail into the causes, symptoms, and treatment of the malarial diseases of the Tennessee Valley, with a particular account of that form of the disease attended with hæmaturia, illustrated with several cases carefully reported by various physicians of that portion of the State.

These reports, from so many widely separated localities, all devoted chiefly to *hemorrhagic malarial fever*, prove very evidently that a type of malarial disease, formerly of infrequent occurrence, has, within a few years past, become prevalent to an alarming extent, and indicating clearly that there exists some general cause for its production; which cause is recognized with great unanimity to be "the almost entire neglect of drainage consequent on the changed condition of agricultural pursuits since the war." From several of the counties "Surgical" reports were received embracing many interesting cases.

Among the special reports we have one on the "Increase in the Habit of Opium Eating," by Dr. J. S. WEATHERLY. One on the "Medicinal Properties of the Sulphites and Hyposulphites," particularly their value in the various forms of malarial fever, including the hemorrhagic, by C. F. FAHS. One on the "Treatment of Malarial Fever," by Dr. A. G. MABRY, and another on the "Treatment of Relapses," by Dr. A. C. MATHESON. Both these last papers are of a very interesting character.

The "Annual Address" of Dr. J. B. GASTON, delivered by appointment, discusses the question, "What is Life?" or rather, "What are the Dynamical Agencies of Life?"

7. The proceedings of the *South Carolina Medical Association*, of May, 1869, consisted mainly in the adoption of measures for the effectual reorganization of the Association, under a revised constitution. But few professional topics were introduced, and of these few no details are given.

8. At the thirty-sixth annual session of the *Tennessee Medical Society*, April, 1869, the committee to analyze the different points embraced in the address of the ex-President, Dr. Lipscomb, report, that in the address at least four distinct

suggestions occur, which are clearly set forth, and ably discussed. The first is the importance of confining inter-marriage to individuals of the two sexes who have no strong tendency to disease, who are of different temperaments, and who are not closely related. The second suggestion is the increase of charlatanism, particularly in our larger cities, and the difficulty of arresting it without severe penal enactments rigidly enforced. The third suggestion of Dr. L. is the importance of disseminating a knowledge of human physiology throughout the community by teaching it in our schools, academies, and colleges as an integral branch of common education. The last, but not the least suggestion of the address is the importance of establishing a high standard of medical education to secure which the examination of candidates for the doctorate should be conducted by a board of competent and disinterested physicians, without whose approval no one should be admitted to become a practitioner of medicine. To go one step further back, private teachers should not receive in their offices as a pupil any one who is, either from defect of education or of mental ability to any extent, incapable of mastering a competent knowledge of the science and the art of medicine.

Dr. SEARCY, in a paper in reply to the question, "Can Scarlet Fever be prevented?" related a number of cases he had met with, during a series of years, showing, as he believed, that the tonsils were the part through which the *materies morbi* gained admittance into the system. On discovering in these parts the earliest indications of commencing disease, applying at once a strong solution of nitrate of silver, (ʒj to water ℥j), and repeating it twice each day for several days, with mild laxatives and proper diet, would, he thought, in the majority of cases, mitigate, if not prevent the threatened attack.

Dr. T. L. MADDIN, presented an able and practical paper on "Diphtheria, its history, pathology, and treatment."

Dr. J. MORTON, Jr., read a paper describing the then recent "Railroad Disaster," on the Decatur road near Normandy.

Dr. P. F. EVE read an elaborate account of remarkable cases of "Gunshot Wounds and other Injuries of the Cranium," in which he discussed the relative merits in these cases of heroic and of conservative surgery.

Dr. R. THOMPSON presented a detail of his experience in favour of the use of "Medicated Slippery Elm," in the form of Pessaries and Bougies.

9. The nineteenth annual session of the *Indiana State Medical Society* was opened by an address from the President, Dr. N. FIELD, on the "Troubles and Responsibilities of the Medical Profession."

This is followed by a very sensible paper by Dr. V. KERSEY, in solution of the question, "Why Doctors Disagree?"

Next is a not very complete account of a case of "General Anasarca," with remarks by Dr. J. MOFFETT.

Dr. W. J. ELSTUN contributes a paper on the "Digestive Assimilation of Medicines."

A case of "Dislocation of the Femur upwards and backwards," reduced by manipulation, is related by Dr. M. SEXTON, which gave rise to an interesting discussion.

A discussion which took place on "Puerperal Convulsions," though interesting elicited nothing new as to the true character or treatment of the disease.

D. F. C.

ART. XXXII.—*Fœticide, or Criminal Abortion; a Lecture Introductory to the Course on Obstetrics and Diseases of Women and Children. University of Pennsylvania, Session* 1839-40. By HUGH L. HODGE, M.D. 12mo. pp. 44. Philadelphia: Lindsay & Blakiston, 1869.

THIS very forcible protest of the venerable Emeritus Professor Hodge against the destructive evil of criminal abortion, and which is to be viewed as a direct

violation of the laws alike of God and man, was, as its title announces, delivered in the year 1839, as an introductory lecture to the author's course of instruction on obstetrics, etc., in the University of Pennsylvania; and was printed for the benefit of the members of his class and of their friends. Deeming the subject one of very great importance, the lecture was reiterated by Dr. H. to the students composing the class of 1854–55. A new edition of it was then printed and widely circulated.

As many of his former pupils have applied to him for copies of the Essay, delivered in 1839 and repeated in 1854, Dr. H. consented to its republication in the edition before us, believing it to be the duty of every physician who would be true to his professional obligations to exert all possible influences to protect the health and welfare, and to promote the best interests of society. The consent thus given, Dr. H. remarks, is not only to gratify many of his medical friends, but "to contribute, in some degree, to the still further dissemination of those fundamental facts and principles on which must rest all the arguments against criminal abortion."

A few additional observations have been appended to contribute as far as possible "to illuminate the minds of parents, guardians, and all those intelligent and virtuous citizens who superintend the education of youth, or who, in any way, can contribute to form the character of the rising generation or to stay the progress of this alarming social evil." D. F. C.

ART. XXXIII.—*A Handy-Book of Ophthalmic Surgery.* By JOHN Z. LAURENCE, F. R. C. S., M. B. (Univ. Lond.), Surgeon to the Ophthalmic Hospital, Southwark; Ophthalmic Surgeon to Saint Bartholomew's Hospital, Chatham, etc. etc.; assisted by ROBERT C. MOON, Late Assistant-Surgeon to the Ophthalmic Hospital, Southwark. With numerous illustrations. Second edition, revised and enlarged by J. Z. LAURENCE. 8vo. pp. 227. Philadelphia: Henry C. Lea, 1869.

THE object of the author, as expressed in his preface to his first edition, "to bring the principles and practice of modern ophthalmic surgery within a small compass to supply the wants of the busy practitioner," would appear to have been successfully attained since his second edition now appears under that inexorable law of supply and demand.

Regarding the manual as a brief terse compendium of the established facts of ophthalmic medicine, its value would be fully recognized as a work for ready reference, although a busy practitioner might prefer the perusal of more than one page descriptive of Græfe's method of extraction and its results, before assuming the responsibility of the operation.

For those, however, who must assume the care of diseases and injuries of the eye, and who are too much pressed for time to study the classic works on the subject, or those recently published by Stellwag, Wells, Bader, and others, Mr. Laurence will prove a safe and trustworthy guide. He has described in this edition those novelties which have secured the confidence of the profession since the appearance of his last.

To the portion of the book devoted to a description of the optical defects of the eye, the publisher has given increased value by the addition of several pages of Snellen's Test Types, so generally used to test the acuteness of vision, and which are difficult to obtain in this country.

The volume has been considerably enlarged and improved by the revision and additions of its author, expressly for the American edition, and the publisher has given it to the profession in a substantial and pleasing form. W. T.

ART. XXXIV.—*A Course of Practical Chemistry arranged for the Use of Medical Students.* By WILLIAM ODLING, M. B., F. R. S., F. R. C. P., Lecturer on Chemistry at St. Bartholomew's Hospital. With Illustrations. From the fourth and revised London edition. 12mo. pp. 261. Philadelphia: Henry C. Lea, 1869.

THIS work having passed to a fourth edition while so many works on chemical analysis, most of them excellent in their character, have been equally successful, shows decisively that the importance of chemical pursuits has taken a strong hold on the public mind. This work is designed for the medical profession, who form a majority of those whose wants have to be thus supplied. Dr. Odling is among the chemists who have stood prominently forward in developing and teaching the doctrines of modern chemical philosophy, although in the first editions of this work the new views were not adopted as a whole, the old atomic weights being still used with much of the old nomenclature. This has been modified in the present, by employing throughout the new system of atomic weights, formulæ, and nomenclature. The account of these views in the introductory chapter on chemical relations is remarkably clear and simple. The remainder of the introduction is taken up with chemical manipulation, an important preliminary step in the instruction of the analytic chemist, who must use not only skill and neatness in all the processes required, but also promptness in the formation and adaptation of means to an end especially in cases of emergency.

The second chapter is on analytic chemistry generally, commencing with general reaction, the use of the blowpipe, solution, and precipitation, distributing the basic bodies into three groups, according to the reactions with sulphuretted hydrogen and sulphide of ammonium, with the special and discriminating behaviour of each. The third chapter is devoted to toxicological chemistry, in which the most important of the inorganic and organic poisons are noticed, with the different tests by which they may be clearly distinguished. The last chapter, on animal chemistry, contains an account of the principal constituents of the organic fluids and tissues, with an account of the urine, both normal and abnormal, the blood, and other animal products. Throughout the work diagrams of apparatus of an improved kind are introduced, together with the appearances of precipitates, etc., under the microscope, whenever this should be characteristic. As a teacher of chemistry of many years' standing, Dr. Odling has necessarily become acquainted with the wants of the student of chemistry, and has fully satisfied these requirements in a small space. The work is written concisely, but still most clearly, and is exceedingly well adapted to the special introduction of the chemical and medical student. R. B.

ART. XXXV.—*A Manual of Elementary Chemistry, Theoretical and Practical.* By GEORGE FOWNES, F. R. S., late Prof. of Practical Chemistry in University College, London. From the 10th revised and corrected English edition. Edited by Robert Bridges, M.D., Prof. of Chemistry in the Philadelphia College of Pharmacy. With 197 illustrations. 12mo. pp. 857. Philadelphia: Henry C. Lea, 1869.

THE long period which has elapsed since the publication of the last American edition of this work renders the present very acceptable to the American student of chemistry. So rapid has been the progress of chemical science that any exposition, however elementary, of its condition for any one year will in a short time so far fall behind both in fact and theory as to fail to meet the wants of the student of this science. The very favourable reception with which the manual of Fownes has always met, placing it in the foremost rank as authority,

has enabled it to hold its place in public estimation, notwithstanding the defect of not fully representing the present condition of chemistry. It is, therefore, a subject of much satisfaction to a large number of chemical teachers and students that this long needed revision should have been presented in its American garb. The labour required in its preparation, which was almost as great as re-writing the book, has been ably and thoroughly performed by its English editors, Dr. Bence Jones and Mr. Henry Watts, equalling in conciseness of language and lucidity of ideas the original writing of Fownes.

The new matter to be noticed in the preliminary parts, in relation to light and heat, are a general outline of the spectroscope, its revelations and applications, the relations between heat and mechanical force, and the dynamic theory of heat.

The new notation and nomenclature as at present used in Europe are adopted throughout, the atomic weights as differing from the equivalent, being, according to present usage, doubled in many of the elements. A part of the nomenclature used, that of ic and ous oxides, produces some confusion in its new application, especially in compounds which have become of public use, such, for instance, as of nitrous oxide given to the third, and not the first oxide, and nitric oxide to the fifth (anhydric nitric acid) instead of the second oxide. Also the prefix di is now used for the second oxide, while formerly it was applied to those cases in which a metallic radical was considered to be in the double atomic relation.

The principles of chemical philosophy have been nearly all rewritten to correspond to the newer views of atomicity and equivalency, or saturating power, comprising also the explanation of the most usual methods by which the differences in equivalent value are denoted both in regard to single elements as well as when arranged in diagrams expressive of constitutional formulæ. In consonance with this idea of equivalency, the elements are arranged under the six classes of monads, diads, triads, tetrads, pentads, and hexads, and although this classification is not adhered to in treating of the non-metallic bodies, it is strictly followed in considering the metals and their compounds. In relation to this part we notice the introduction of new illustrations of improved apparatus.

It is in the department of organic chemistry that the greatest modification, both in arrangement and matter, is to be found, occupying nearly one half the bulk of the work. Considering organic chemistry as in fact the chemistry of carbon compounds, the classification is based on the equivalency or atomicity of carbon itself and its numerous compounds, and the transformations they undergo are considered from this point of view. Commencing with a view of the relations of the homologous and isologous series, and the peculiar nomenclature which has been proposed to distinguish them, the organic compounds are distributed into seventeen classes: 1, Hydrocarbons; 2, Haloid ethers; 3, Alcohols, &c., each of which is subdivided into several series, according to relation in number of the atoms of hydrogen to those of carbon. Under the different heads the most important compounds are described sufficiently to characterize them, and at the same time not occupy too much space. Bodies not at present capable of classification, and compounds derived from the animal kingdom, terminate the work.

To the student of chemistry, who has been educated in the older views of the science, and who has not attentively followed the progress of the past years, the changes here noticed will appear as formidable obstacles to his further progress, but it is to be hoped will not deter him from the examinations of the new views, and although he may not adopt the assertion that it is without doubt more logical, more consistent in its parts, explains phenomena better, and sticks closer to facts, yet he will be rewarded by additional insight into nature's works, and inspired by the hope of a prospective clearing of the confusion that has heretofore pervaded the bounds of organic chemistry.

QUARTERLY SUMMARY

OF THE

IMPROVEMENTS AND DISCOVERIES

IN THE

MEDICAL SCIENCES.

ANATOMY AND PHYSIOLOGY.

1. *Contractility of the Lungs.*—M. P. Bert, in a note, communicated Aug. 23d, to the Academy of Sciences, through M. Claude Bernard, states that his experiments justify him in asserting that the tissue of the lungs is contractile and that its contraction is produced by the influence of the pneumogastric. When the pneumogastric is divided in the neck, the peripheral portion loses its power of acting on the lungs, the heart, and the œsophagus. Although the contractility of the lungs is lost, nevertheless the lungs remain perfectly sound, even the vibratile ciliæ continuing their action.—*Gaz. Hebdomadaire*, Sept. 3, 1869.

2. *Cell Elements of the Tendons and Areolar Tissue.*—The *Archives de Physiol.* (No. 4, 1869) contains an important memoir on this subject by Dr. Ranvier. His observations lead to the following conclusions: The connective tissue is essentially formed of connective bundles, of elastic fibres, and of cells. Neither laminæ nor holes can be observed in it. The bundles of the connective fibres are cylindrical, they have a very variable diameter, they are limited by a special layer of annular or spiral fibres. These fibres appear to be a simple thickening of the membrane, thus they are coloured by carmine, and differ therefore from elastic fibres. All the cells are formed of granular protoplasm and contain well-formed nuclei. These cells are placed between the bundles of connective tissue; some, globular in shape, appear capable of moving easily in the spaces left between the bundles; other cells flattened, take up a position along the bundles which they do not easily quit. The stellate cells (*cellules plasmatiques*) seen in transverse sections of dried tendons, are situated at a point where many of the bundles come in contact, and at that spot a nucleus surrounded by protoplasm is situated in a space limited by the exterior of the bundles; the bundles cut transversely form a network-like arrangement, and Ranvier believes in the existence of a canalicular network in which the cells are included. He believes in the existence of a plasmatic circulation in the connective tissue, and, from the presence of cells like the white blood-globules, conceives it to be a true lymphatic circulation, and he suggests the existence of a great space between the bundles of the subcutaneous connective tissue analogous to a serous cavity.

3. *Regeneration of Cartilage by its Perichondrium.*—The recent researches of Dr. Peyraud, of Paris, establish not only the possibility of the regeneration of cartilage, but prove, beyond doubt, that this power lies exclusively in the

perichondrium, and this permits of a parallelism between the specificity of this membrane and the periosteum.

The animals experimented on were mostly young dogs, from two to six months old, because the perichondrium at that age is very thick, can be detached without great difficulty, and, as already observed, is more richly supplied with bloodvessels. The cartilage which is most suitable for these experiments is the costal cartilage. Those of the ear or nose give equal results, but require more care on the part of the operator.

For those who wish to repeat the experiments I would say—Make an incision parallel to the direction of the rib down to the perichondrium. Incise this membrane along the middle line of the anterior surface of the rib; pass a sharp spatula beneath the perichondrium, denuding it from the portion of cartilage to be removed, so as to leave an empty sleeve of fibrous membrane.

The result of these experiments—over thirty in number—made by Dr. Peyraud, has been a perfect regeneration of the removed cartilage by cartilage. The chondroplastes were always more numerous and further advanced in their development at the circumference of the rib than in the centre. The two ends of costal cartilage had taken no part whatever in the regeneration; these ends were found rounded off, cone-like, and calcified or ossified. Many of these specimens have been examined by some of our first microscopists (Vulpian, Cornil, Ranvier). Their exactness has also been verified at recent meetings of the Société de Biologie and Société d'Anatomie. The animals were sacrificed from one to six months after the experiments, so that the experimentalist was able to study the regeneration of the cartilage in all its phases.

The same resections practised without preservation of the perichondrium gave negative results in each and every experiment. The perichondrium, therefore, or the anatomical element situated upon its under surface, regenerates cartilage just as the osteogenetic sheet, situated beneath the periosteum, regenerates bone.—*Med. Times and Gaz*, Nov. 20, 1869.

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4. *On the so-called Selective Absorption by the Lacteals and Lymphatics.*—*The Journal of Anatomy and Physiology* (Nov. 1869) contains an article by Dr. W. H. BROADBENT, the object of which is to show that this "Selective Absorption" is apparent only, and that it is another exemplification of the physical process of liquid diffusion.

"The lacteals and lymphatics," he says, "are parts of the same system, the former differing in having a special purpose in relation with the digested food, but in structure and function they are essentially similar, and it will be an advantage to consider them together, the lymphatics presenting the problem of function in a simpler form.

"As to structure it seems now to be very generally admitted that the commencing lymphatic plexuses are simply the interstices between the fibres of the textures from which start delicate vessels with distinct walls. Some observers say that these interspaces have a thin epithelial lining, but this is not important. It is not so evident that the lacteals are mere intertextural spaces; but this is asserted by His on very good grounds, and it is extremely probable that it is so, the greater minuteness and regularity of the network as seen by injections resulting from the arrangement of the glands and crypts of the intestinal mucous membrane. It is clear, whether these commencing lacteals have proper walls or not, that they occupy all the intervals between the capillaries, glands, and fibres, and at most they can have only a delicate epithelial lining. From the structure alone then we should be justified in putting down Selective Absorption as impossible; mere spaces cannot attract any particular substance.

"When the conditions under which the absorption by the lymphatics takes place are considered, it is at once evident that the process is merely passive. Under the pressure of the blood in the arteries, a certain amount of fluid exudes from the capillaries for the nourishment of the tissues. Not only do the tissues abstract from this fluid the materials for their construction, but it is the medium in which the process of oxidation takes place, and in which the products of oxidation and disintegration are primarily found. It is constantly

being charged, therefore, with carbonic acid, urea, &c. We have thus a fluid in the interstices of the tissues containing carbonic acid, &c., and in the capillaries the blood containing oxygen. Mutual interchange of diffusible constituents will necessariiy take place in accordance with the law of diffusion till the two fluids reach the same level of composition, and thus by the time the blood has arrived at the venous side of the capillary network it will have lost its oxygen and taken up carbonic acid, &c., converse changes occurring in the interstitial fluid. But while the diffusible products of oxidation thus find their way from the interstitial fluid to the blood-current, the non-diffusible colloid matters which have transversed the delicate capillary membrane outwards under pressure, cannot return against pressure, and must remain in the intertextural spaces which are no other than the commencing lymphatics. The lymphatics then cannot be said to exercise absorption in any sense whatever, they simply receive the spare nutrient material which is forced onwards by the continued exudation of fresh fluid from the capillaries, and finds its way along the vessels to the thoracic duct.

"Examining now the conditions under which Lacteal Absorption occurs, we have the intestinal mucous membrane bathed in the products of digestion consisting of salts, sugars, peptones, and fats in solution or suspension in water, together with the constituents of the digestive fluids. The epithelium and subjacent structures are saturated with these matters, and they all, even the fatty substances in small proportion, find their way into the capillaries. We do not perhaps altogether understand the one-sided diffusion which results in the transfer of all the soluble contents of the intestine to the blood, but we are justified in referring the general absorption from the intestinal surface to the osmotic process, aided possibly by pressure. Without, however, dwelling on the passage of the various products of digestion through the epithelial layer and basement-membrane, it must be pointed out that in order to enter the bloodvessels, a second membrane, the capillary wall, must be traversed. All the matters, salts, sugar, albuminose, and fat, must in fact on first penetrating the basement-membrane find themselves in the interstices of the textures, *i. e.*, in the interspaces which, whether lined by epithelium or not, constitute the commencing lacteal plexus, and they will pass thence through the capillary wall in the order of their diffusibility, salts most rapidly, then sugar, then peptones, and lastly, fats. A small proportion of the fatty matters is found to enter the blood in this way, but being greatly inferior in diffusibility even to the peptones, the fat is left behind in the intertextural spaces by the other constituents, and by its predominance arising in this way gives the chyle its characteristic composition and properties.

"The lacteal absorption is thus not selective and special, but general and residual, and the office of the lacteals is not the abstraction from the mixed contents of the intestine of the fat as an ingredient of special value, but to prevent the waste of this valuable ingredient by providing a readier mode of access to the blood in the place of the slow diffusion through the capillary walls which would result from its high osmotic equivalent."

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5. *An Investigation into some Points of the Anatomy and Physiology of the Cervix Uteri, the Glands of its Mucous Membrane, and a Function of the Cervix unconnected with Delivery.*—M. Despres, Surgeon to the Lourcine Hospital, read a memoir, having this title, at a recent meeting of the Imperial Academy of Medicine.

The following are his conclusions: 1. The cervix uteri contains glands distributed in bunches or ramified tubules, having their seat partly in the muscular substance of the uterus, like the prostatic glandules in the midst of muscular fibres. 2. These glands secrete a clear, viscid, albuminous liquid, analogous to the prostatic liquid, which issues from the cervix in an intermittent manner, giving rise to ejaculation on the part of the female. This "uterine liquid" issues slowly from the cervix, remaining within its cavity and at the os uteri. It has hitherto been improperly regarded as a variety of catarrhal fluid. 3. The object of ejaculation in the woman is to furnish a vehicle for the spermatozoa in order to insure their safe arrival within the cavity of the uterus. 4.

These glands of the cervix become obliterated during pregnancy, and constitute cysts or Naboth's ovules. But delivery replaces matters as they were by rupturing the cysts during its progress or during the subsequent retraction of the uterus. 5. The cervix of the uterus is erectile, entering into the condition of erection simultaneous with the other erectile female organs, and partially opening to enable the uterine fluid to issue.—*Med. Times and Gaz.*, Nov. 27, 1869.

6. *The Presence of Sulphocyanides in the Blood and Urine.*—Dr. LEARED, in a paper read before the Royal Society (*Proceedings of Royal Society*, No. 114, 1869), states that from the examination of the saliva of fifty individuals taken consecutively, he has established that in the saliva of the great majority of persons a red colour is struck with perchloride of iron, a reaction which is due to the presence of sulphocyanide of potassium. It was ascertained that the existence of carious teeth is not requisite for the production of this reaction, because it occurred in many instances in which all the teeth were sound; also that tobacco-smoking was not indispensable, because the colour was produced in many cases in which the individuals never used tobacco. It was also remarked that in all the cases in which the absence of the sulphocyanide was noted, although no definite disease was apparent, the health was feeble, and that, on the other hand, a marked reaction with iron usually corresponded with the ordinary indications of sound health.

Dr. Leared has detected a sulphocyanide in the urine averaging about one-eighth of a grain in sixteen ounces of normal urine—and also in the blood of man and all other vertebrate animals. As far as he has been able to determine the sulphocyanides exist only in the serum, and this leads Dr. Leared "to the consideration of that much-vexed question, the cause of the red colour of the blood. So far as concerns exact colour, nothing more closely resembles blood than a solution of sulphocyanide of iron. This is *primâ facie* evidence that red blood owes its colour to this iron compound. The iron is known to be localized in the globules. These are surrounded by a fluid containing sulphocyanic acid in a combination which easily yields the acid when required. Such is the theory at present suggested."

"I am not unaware of the difficulties in the way of its acceptance. The colour of hæmatin cannot, it is said, depend upon the iron it contains, because nearly the whole of the iron may be removed without affecting the colour of the hæmatin."[1] But it is not stated that all the iron is ever removed, and it may be that a very small proportion suffices for the formation of the colour, while the larger proportion of the metal is held in reserve in the globules in the same manner as sulphocyanic acid appears to be in the serum.

If Dr. Leared's experiments have been rightly interpreted, it is certain that sulphocyanide of potassium or sodium is not a mere product of the salivary glands.

Carefully conducted experiments proved that sulphocyanide of potassium neither possesses the power of preventing ordinary fermentation nor that of checking it when already in action, but that it does possess an antiseptic power; but whether or not this property comes into operation in the alimentary canal is a question not yet decided.

7. *Urine of the Infant.*—Dr. POLLACK (*Jahrb. f. Kinderheilk.* New Series, II.) gives the general results of his examination of the urine in a large number of infants at the breast, aged between eight days and two and a half months. The urine from the males was received in an appropriate utensil, and from the females it was drawn off by the catheter. The quantity varied between 250 to 410 CC. It gave an acid reaction. The quantity passed in twenty-four hours varied from 1 to 2 grm. The uric acid in the twenty-four hours is relatively increased from 0.1 to 0.2 grm. per diem. The inorganic salts are present, but in less quantity than in those of a more advanced age, particularly the earthy

[1] Elements of Chemistry by W. Miller, M. D., 3d edit. p. 872.

phosphates. The urine, in its normal state, of the suckling has a cloudy appearance, from an admixture of mucus. In early infancy the urine has also a much larger amount of sugar than that of the adult, in consequence of the rich saccharine character of the mother's milk. The small quantity of the phosphates, and of the results of the decomposition of albumen in the urine of infancy, results from the fact that these constitute the materials requisite to the building up of the body, and hence are retained in the organism.—*Centralblatt. f. d. Med. Wissenschftn.*, Jan. 1869, No. 7. D. F. C.

MATERIA MEDICA, GENERAL THERAPEUTICS AND PHARMACY.

8. *Hydrate of Chloral.*—This article has been known to chemists for more than thirty years, but has never been used as a medicine until very recently, when Prof. Liebreich, of Berlin, struck with the reaction which takes place in the presence of alkalies, which decompose it into formic acid and chloroform, was induced to hope that the same reaction would take place when it was introduced into the system between it and the alkalies of the animal economy, and thus produce gradually the effects of chloroform. Led by this idea he instituted experiments upon frogs and other animals, and found that it produced in all of them similar results, viz., deep hypnotism, reflex movements of excitement, then entire loss of motion. Restoration afterwards was complete without any stage of excitement. When the dose was too large, the animals died from cardiac paralysis.

Liebreich afterwards studied its effects on man at the Charity Hospital, Berlin. 1.35 gramme by hypodermic injection induced sleep in five minutes in an insane person, which continued for five hours; 3.50 gr. in a glass of water, induced calm sleep in a melancholic man, which continued for sixteen hours.

Langenbeck relates a case of delirium tremens with comminuted fracture of the arm, in which large doses of opium gave no relief. Four grammes of the hydrate of chloral taken internally, and two hypodermic injections of two grammes each, produced a long and quiet sleep.

Dr. B. W. Richardson, of London, repeated the experiments of Liebreich, and in our previous No., p. 538 *et seq.*, will be found a summary of his investigations. This last eminent physiologist has since extended his researches, and in his lectures on Experimental and Practical Medicine (*Med. Times and Gaz.*, November 6, 1969), gives the following summary of the conclusions he has come to from experiments with the article:—

"The effects of hydrate of chloral may be summed up as follows:—

"(*a*) Deep and prolonged narcotism can be safely produced by the hydrate of chloral.

"(*b*) During a portion of the period of narcotism there may be complete anæsthesia with absence of reflex actions, and a condition in which every kind of operation fails to call forth consciousness.

"(*c*) During the narcotism there are intervals of apparent exalted sensibility.

"(*d*) In the transition from drowsiness to stupor there is no stage of muscular excitement, but in birds there is vomiting, as is common in the same animal in the second stage of narcotism under chloroform.

"(*e*) During the narcotism produced by the substance there is invariably reduction of temperature.

"(*f*) The hydrate produces muscular relaxation, which relaxation extends to the muscles of volition and alike to the iris and the muscular arterial system. From the condition of the muscles after death we may infer that this paralysis is in part due to change within the muscular structure itself.

"(*g*) The action of the substance on the nervous system is primarily on the sympathetic ganglia, afterwards on the cerebrum, and finally on the heart.

"(*h*) Recovery, when it takes place, is followed by no bad results.

"(*i*) In fatal cases the functions destroyed are: 1. The cerebral. 2. The voluntary muscular. 3. The respiratory. 4. The heart.

"(*j*) The substance in small proportions arrests in some degree the coagulation of the blood, and in large quantities stops the process of coagulation altogether. In large quantities it also destroys the blood corpuscles and produces general destruction of blood, but the dose required to produce extreme narcotism need not be so large as to lead to serious derangement of blood.

"(*k*) The phenomena observed correspond with those observed under chloroform, and the balance of evidence is that they are the result of the action of chloroform.

"*Therapeutical Value of Hydrate of Chloral.*—The last point we have to consider relates to the therapeutical application of the hydrate. I may premise that the dose to the human subject varies, according to the age of the subject or according to the effects desired by the administrator, from seven grains to two drachms. For young children Liebreich recommends seven grains as the dose. For adults, if short intervals of sleep are required, from twenty-five to thirty grains may be administered, and may be repeated every two or three hours, by which a safe and continuous action may be maintained. In cases where more determinative effects are demanded at once, from one to two drachms may be given at once.

"The hydrate may be prescribed in solution with water. It must be well diluted—say in proportion of ten grains to the ounce of water, for it is pungent if not well diluted. The addition of a little tincture of orange, as suggested by Liebreich, is an advantage when the substance has to be swallowed. Altogether, I prefer administration by the mouth rather than by subcutaneous injection. The agent acts quite as well and as quickly when thus administered, and in the same dose. I also myself prefer to prescribe moderate and frequently repeated doses rather than one large dose.

"Liebreich, in his communications, recommends the hydrate of chloral for neuralgia and rheumatism, for convulsive cough and tetanus, for acute mania and delirium tremens, for gall-stones, for removing the pain of small surgical operations, and for local application for the relief of local pain. In cases where there is gastric irritation, as from ulceration, he thinks it should not be administered by the mouth, but should be injected subcutaneously. He seems to have obtained the best results from its use in cases of acute mania and delirium tremens.

"We may ourselves draw the clearest indications of therapeutical value from the experimental facts connected with the action of the hydrate which have been presented to us in experiment. Let us sum up these facts. The hydrate *produces sleep, removes sensibility, brings down the animal temperature, and causes extreme muscular relaxation.* Taking these facts as our guide, we may reasonably put it to the test for the relief of various diseased states and conditions.

"1. Because the hydrate *produces sleep*, it may be employed in cases of sleeplessness and excitement where opium or other narcotics are objectionable. It may thus be used in acute mania, in delirium tremens, and possibly during hysterical excitement.

"2. Because the hydrate *relieves pain*, it may be administered as a substitute for opium, or independently, in cases of suffering from acute pain, as in neuralgia, rheumatism, cancer. It may also be used for the same intention in surgical cases attended with much suffering, and may be carried in such cases, when required, to the extent of rendering a painful part sufficiently insensible to admit of its being altered in position or readjusted. We often have cases of painful disease of joints—strumous disease of the knee-joint, for example—where an agent like the hydrate of chloral may become of the greatest service for the purpose just described. The same application may likewise extend to the treatment of compound fractures where it is important that the injured parts should be moved without the excitement attendant upon suffering.

"3. Because the hydrate *reduces the animal temperature*, it may be tested, with every probability of advantage, in cases where there is rapid increment of heat—fever—with restlessness and excitement. I select cases of surgical fever

as cases singularly happy in illustration of this position. In examples where accident or surgical operation is succeeded by heat of body with constant pain, sleeplessness, and tendency to delirium, I can imagine no treatment better than the administration of moderate and frequently repeated doses (say twenty to thirty grains every two hours) of the hydrate. Under its influence sleep would be induced, pain and excitement relieved, temperature brought down, and undue waste suspended. What is more, the tendency of the agent is to maintain the fluidity of the blood, and thus to prevent the most dangerous of all occurrences in acute disease, separation and deposition of fibrine in the circulatory system.[1]

"4. Because the hydrate *produces extreme muscular relaxation*, it may be reasonably employed in various cases, medical and surgical, where it is necessary to overcome muscular resistance or spasm. Thus it may be employed in tetanus, in cases where there is passage of gall-stone, and, I should think with special advantage, in strangulated hernia. In this latter case it would have a double meaning. It might be employed not only for rendering reduction by the taxis easy, to the avoidance of an operation, but if operation were afterwards unavoidable, it would tend to remove the pain of the operation and to be of service to the operator by sustaining relaxation.

"It is unnecessary for me to trouble you with further suggestive details. The physiological action of the hydrate of chloral understood, its applications will occur equally to all; I shall therefore be content simply to record that the external use of chloral for the relief of pain as recommended by Liebreich does not, according to my experience, correspond with its usefulness as an internal remedy. I find that when applied to the skin it creates some irritation, and in a typical case of superficial and local neuralgia, where I have employed it for a week with great care, it has had no effect in relieving the pain of the sufferer."

In Paris the hydrate of chloral has attracted great attention, and numerous experiments have been made with it, but with contradictory results. This M. Bouchut attributes to the greater or less purity of the substance used by different experimenters. He says that chloral should be used in the state of solid hydrate; and that when it is pure, the results are rapid, manifest, and energetic; these are the most calm hypnotism, and almost absolute insensibility. In *L'Union Médicale* (Nov. 13th, 1869) the researches of M. Bouchut are summed up as follows:—

"Hydrate of chloral is a powerful sedative of the motor and sensitive nervous system. The dose should not exceed five grammes for adults, and two grammes for children. It may be administered by the mouth, but its effects are more prompt when given by the rectum. Injected hypodermically, it gives rise to formidable eschars. The urine during the sleep induced by chloral is neutral, and when boiled with Fehling's liquor it does not reduce the salts of copper. But twenty-four hours after awakening, when it contains chloral, it is more dense, and reduces the salts of copper, so that a temporary glycosuria which does not exist might be suspected. The action of chloral is that of chloroform, but it is longer in being produced, and lasts for a longer period. In some subjects it gives rise to an intoxication resembling that of alcohol, but in nowise of so disgusting a character. In almost all it produces sleep, which is rarely accompanied by hyperæsthesia, a deep anæsthesia being present in the great majority of cases. This is usually in proportion to the quantity employed, and in a dose of from two to five grammes, according to age, it is complete enough to allow of the application of cauteries without pain being felt, and even of the extraction of teeth. As a therapeutical agent it is a sedative in the violent

[1] "Since this lecture was delivered, my friend Mr. William Adams, struck with the above suggestion, and with the view of acting upon it, consulted me respecting a case of compound fracture and commencing surgical fever in a man under his care in the Great Northern Hospital. I recommended that the hydrate of chloral should be administered in doses of twenty-five grains every two or three hours until the temperature of the patient, which had risen to 102° Fahr., was reduced to the natural standard. The treatment was carried out by Mr. Adams with the most satisfactory results."

pains of gout and the severe suffering arising from nephritic colic or dental caries—in fact, the first of anæsthetics administered by the stomach. It is also the most prompt and effectual remedy in severe chorea, when the object is to arrest convulsions that menace the safety of the patient."

M. DEMARQUAY, who was the first in Paris to experiment with chloral, questioned its anæsthetic properties, though he admitted that it was a most excellent hypnotic, and he denied the transformation in the economy of chloral into chloroform. The more recent experiments of MM. PERSONNE and ROUSSIN, however, as communicated to the Imperial Acad. Med. (*L'Union Méd.*, Nov. 30 and Dec. 2, 1869) show the correctness of Liebreich's statement that chloral, when it reaches the blood, undergoes decomposition under the influence of the alkalescence of that fluid, and is decomposed into formic acid and chloroform, and is ultimately converted into chloruret of sodium and formiate of soda, which thus form the products eliminated. Further, if chloral be mixed with blood recently drawn from the vein, and maintained at the temperature of the body, no odour of chloroform is perceived; but if a current of air is caused to traverse the mixture, the odour is immediately apparent. In contradiction to M. Bouchut, M. Personne maintains that chloral is never met with in the urine, and of this he has no doubt whatever. As to the reduction of the cupro-potassic liquid mentioned in proof by M. Bouchut, it should be known that in consequence of the urates which it contains, urine will always reduce the copper, providing the ebullition be continued long enough. Neither the presence of chloroform, nor even of glucose, is requisite for this.

M. Léon Labbé and M. Goujon confirm the hypnotic effects of chloral, and state that when given in sufficiently large doses it is also an anæsthetic, producing at first, sleep, and afterward anæsthesia.

MM. DIEULAFOY and KRISHABER have likewise been experimenting with chloral, and in a communication to the Imperial Acad. of Medicine (Oct. 4), state the following as their conclusions:—

1st. Chloral, in weak doses, excites sensibility; in strong doses it gradually diminishes sensibility, and brings on complete anæsthesia. 2d. The animals in which anæsthesia is brought on pass through a preliminary condition of excitement. 3d. When anæsthesia has been general and absolute, the animals remain in this condition during several hours, and then die almost immediately. 4th. The sleep may be attended by hyperæsthesia or anæsthesia; in the latter case resolution is complete. 5th. Chloral modifies deeply the number and rhythm of the heart's movements; it gradually diminishes the action of the diaphragm; heat is notably diminished. 6th. The phenomena excited by chloral are in many points different from those produced by chloroform, though anæsthesia is the same in both cases.

In a second communication, M. Léon Labbé thus states the result of his researches: 1. Chloral, when introduced in sufficient quantity into the blood of an animal, produces anæsthesia, but without that preliminary condition of excitement which obtains with chloroform. 2. When introduced into the alimentary canal, or under the skin, it produces first sleep, and then anæsthesia, but in a lesser degree than when directly introduced into the blood. 3. In these cases there is some slight irritation, but nothing to be compared to hyperæsthesia. On account of the various circumstances above stated, he does not believe that chloral is transformed into chloroform.

As will be seen, these two series of experiments differ in their results, not only from each other, but from those already published by Liebreich, Richardson, Demarquay, Personne, and others.

These differences, no doubt, result partly to the experimenters being too hasty in announcing their conclusions, and partly as suggested by M. Bouchut, to the degree of purity of the article employed.

M. GIRALDES, of the Hôpital des Enfants, who has been experimenting with chloral with the care which characterizes his investigations, stated in a communication to the Surgical Society of Paris, that so far as he had been able to see, chloral would become an invaluable auxiliary in cases of nervous symptoms of a traumatic origin, where it is desirable to possess a therapeutical agent which has not the stupefying properties of opium. He added that chlo-

ral cannot compete, as an anæsthetic, with chloroform, because it allows the reflex actions to subsist, which chloroform destroys and annihilates. This view he founds on the following facts: He had administered the substance to two children of about three years of age, one of whom he had intended to operate on; the other presenting, subsequently to amputation, a condition of extreme sensibility. Chloral was given in a dose of two grammes to ten grammes of distilled water, with a *quantum sufficit* of ordinary syrup. Both children were thrown into a deep slumber, which lasted several hours, and from which they could scarcely be aroused; but as reflex movements were easily obtained on pinching the skin, M. Giraldès decided not to operate.

Dr. Ch. Ehrle, of Wurtemberg, formerly *chef de clinique* of Dr. Niemeyer, has also administered chloral to man, and relates (*Medicinisches Correspondenz-Blatt. des Würtembergischen arztlichen Vereins*, Sept. 18, 1869) three cases in which he employed it. His first case was that of a man æt. 51, with chronic myelitis, who, for several months had suffered from the most severe pains in the loins and paralyzed lower limbs. The frequent exacerbations of pain compelled him to change his position every quarter of an hour, and rendered sleep infrequent and short. The bromide of potassium, morphia, and baths all failed to afford any benefit. To relieve the patient from his painful condition Dr. E. determined to give him at five o'clock in the evening of the 15th of August last, two scruples (2.60 grammes) of the hydrate of chloral in simple syrup and water. In a few minutes sleep was produced which continued for four hours, during which the patient moaned and complained, but on awakening he had no knowledge of having done so. The pains in the loins were lessened until the next morning whilst those in the feet recurred after midnight with their usual intensity. Neither headache, bad taste in the mouth, nor irritation in the urinary or respiratory organs was afterwards experienced, and the patient praised the medicine.

The subject of his second case was a woman, æt. 40, affected for four years with tabes dorsalis. An interesting circumstance in this case was that the patient was delivered of a vigorous boy three years after the cessation of her menses. She experiences none of the subjective phenomena of pregnancy; she did not perceive the motions of the child, and during delivery suffered no pain. It was necessary to deliver her with instruments. The patient exhibited none of the physical phenomena which would lead to the suspicion of general paralysis. Moreover, she had the characteristic symptoms of incoördination of motion with conservation of muscular power. Her fingers, lower limbs, and back were destitute of sensibility. She had pain around her waist. The fear of tumbling out of bed made her keep a light in her chamber all night. When she desired to grasp an object, she had constantly to guide her hands by her sight; she could not walk except with difficulty and supported by two strong persons. She complained of pains in the lower limbs and a sense of constriction and heat in her back. During the night she could not lie more than a quarter of an hour in the same position, and her sleep was incessantly interrupted and was attended with painful dreams. Dr. E. gave this patient on the 17th of August, at 8 P. M. a half drachm of hydrate of chloral in sweetened water. Immediately afterward the patient eructated gas smelling of the medicine, and she thought at the time that she should vomit; afterwards she fell asleep, and with two short interruptions at 10 P. M. and 1 P. M., she slept until 5 A. M. calmly and free from dreams. On awakening the patient felt strengthened. No ill effects from the medicine followed.

His third case was one of violent neuralgia, which, on account of its regularity, Dr. E. thought particularly appropriate for studying the action of the medicine. The subject of it, æt. 57, had suffered from neuralgia for 20 years, recurring regularly twice a year, generally in August and December, continuing from three to six weeks. The paroxysms occurred at first every two or five minutes; but for some years they came on only every ten or fifteen minutes. The pain was constantly seated in the ramifications of the superior maxillary nerve in the upper lip, the lower eyelid, the alæ of the nose, and the incisor teeth of the right side. For some years after the extraction of a tooth the pain extended to all the teeth of the upper jaw. Sometimes it radiated to the

forehead, temples, and teeth of the lower jaw. The vault of the palate and the point of emergence of the mental nerve, have also been so sensible to pressure that pressure brought on a paroxysm. During the paroxysms the patient experienced a sensation of intense burning in the tongue. He asserts that he could lessen and even remove the pain by rubbing with a piece of linen the lower part of the right side of the face. Latterly the neuralgia recurred, and as the patient derived no benefit from all imaginable narcotics, Dr. E. had recourse to chloral. At half past seven P.M. of the 15th of Aug. he administered two scruples of hydrate of chloral, which was followed by sleep in a quarter of an hour. The intelligent patient stated that he first felt the calming effect of the medicine in the diseased part. His sleep was quiet and free from dreams. Respiration and pulse normal. The patient slept for five hours, when he awakened with pain, but soon went to sleep again and slept for five hours longer. When he awakened the pain seemed as on the previous days. Besides, the patient complained a little of coryza and irritation in the throat. On the 18th of Aug. at half past 9 A. M. two scruples of hydrate of chloral were again given in water and syrup of orange-peel. He slept until 11 o'clock, when his wife, who had misunderstood Dr. E.'s directions, awakened him to administer another dose of chloral which had been ordered to be given at night. The patient again slept until two o'clock, when he was awakened for dinner. He ate with appetite, after which he had a paroxysm of neuralgia, but soon went to sleep again. At 7 P. M. Dr. E. visited him; he did not awake. His sleep was calm, respiration and pulse normal The urine which he passed in the afternoon did not smell of chloroform. A half hour after Dr. E. left, the patient was wakened for supper, after which he had some pains, but again fell asleep, which continued until after midnight. Between one and five o'clock in the morning he was awake and did not experience any suffering. After five o'clock the pains recurred. The patient lauded the medicine and desired it to be continued, notwithstanding its high price.—*Le Movement Médical*, Oct. 24, 1869.

Dr. J. H. BARNES has administered chloral in the Liverpool Workhouse Hospital to ten patients labouring under delirium tremens, and he considers that "while not altogether a perfectly reliable agent, it is, so far as experience points, capable of procuring, in *most* cases a very *rapid* and *peaceful* state of sleep, and capable of administration without trouble or danger in exact definite quantities." A summary of these cases, with Dr. B.'s remarks, will be found in the *Medical News* for the present month.

Dr. Jacobi, of New York (*Medical Record*, Dec. 1st, 1869) has administered chloral as an hypnotic in the human subject in five cases, in four with the happiest results. The fifth showed a single unpleasant symptom, pain in the ears, apparently due to the irritant effect of the drug, insufficiently diluted, upon the mucous membrane of the throat, which was chronically inflamed.

It is proper to add that M. J. V. Laborde, in a communication made to the Imperial Academy of Sciences, asserts that the administration of chloral is not free from injurious results. Given to a healthy man in progressive doses of from 1, 1½, and 2 grammes, daily, he states that chloral induces, especially on the second or third day, an extremely painful sensation at the pit of the stomach, severe colic, nausea, lipothymia, and profuse sweating. Those experiments, which were made upon himself, M. L., did not think it incumbent upon him to carry further.—*Archives Générales de Méd.*, Dec. 1869, p. 758.

We have now laid before our readers a full summary of the existing knowledge respecting the hydrate of chloral—an agent which is at present attracting much attention, and which undoubtedly possesses very powerful hypnotic properties. Whether or not its administration be attended by danger—in what doses it should be given, and in what diseases it will prove most beneficial, are questions which can only be decided by future experience; but from the number of experimenters now at work with this article these questions will doubtless soon be answered.

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9. *Medicinal Uses of the Salts of Atropia.*—Prof. BUIGNET has recently directed attention to the various uses of atropia as a general remedy, and not merely in affections of the eye. Two salts of the alkaloid are used in medicine

—the sulphate and the valerianate. The valerianate is formed by mixing a cooled solution of atropia in ether with a cooled solution of valerianic acid, and from this mixture crystals of the required salt soon crystallize. Acting on the long-established axiom in therapeutics that a combination of two similar remedies almost always produces a greater and more rapid effect than an equivalent dose of either of the single remedies, Dr. Michea, as long ago as 1853, made trial of this salt in "affections of the nervous system," and especially in cases of epilepsy. His account of the action of this salt was so favourable, that a commission was appointed to investigate the subject, and their report was that valerianate of atropia is decidedly preferable to many of the so-called antispasmodics, and that it offered the great advantage of replacing two drugs notoriously variable in their action—belladonna and valerian—by a combination of their active principles, which was far more steady and certain in its action. The method of administering it is in granules, each of which contains a milligramme, or about $\frac{1}{65}$th of a grain, of the salt. One granule daily is the proper dose to begin with in an adult, and in the course of a week a second granule may be taken daily. This is the maximum dose, any excess inducing dilatation of the pupil and disturbed vision. The author quotes the names of more than twenty physicians who have written to confirm the value of atropia and its salts as therapeutic agents. Taken internally, the salts of atropia have been found serviceable in the treatment of epilepsy, chorea, neuralgia, hysteria, tetanus, intermittent fevers, and those forms of disease of the respiratory organs in which the nervous system is specially involved, as asthma, hooping-cough, and certain forms of nervous bronchitis.

It has been found by Bouchardat and Crosio that cases of severe neuralgia, in which opium, henbane, and sulphuric ether have failed to give relief, have yielded to the local application of an ointment composed of five centigrammes (three-fourths of a grain) of atropia and four grammes (about a drachm) of lard. Pescheux has reported a case of tetanus which he cured by the aid of subcutaneous injection of sulphate of atropia, and Béhier, Richard, and other French physicians have practised the same treatment with success in cases of severe localized pain. One part of sulphate of atropia may be dissolved in 100 of water, and from one to five drops injected. Slight symptoms of belladonna poisoning sometimes exhibit themselves in these cases, but are merely transitory. The smaller dose should be first tried.—*Med. Times and Gaz.*, Nov. 20, from *Nouveau Dict. de Méd. et de Chirurg. Prat.* Art. *Atropine.*

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10. *Action and Uses of Ipecacuanha.*—Dr. C. D. Phillips extols (*The Practitioner*, Nov. 1869) the efficacy of the simple powdered ipecacuanha and its wine. It is, he justly considers, an exceedingly safe emetic, and is an unquestionable diaphoretic, whether given in the form of Dover's powder or vinum ipecacuanhæ.

It "exerts a power over all diseased mucous membranes in checking profuse mucous secretions, whether from the air-passages, the alimentary canal, or the genito-urinary apparatus. It is a most useful remedy in spasmodic coughs attended with profuse mucous expectoration and vomiting, especially in those troublesome coughs, accompanied by vomiting, which are incident to pregnancy. Its beneficial operation is clearly discernible in most cases of continued and obstinate retching or vomiting, where the stomach is not primarily affected, but disturbed by sympathy with some other part or organ of the body, whether the primary affection be acute or chronic. There are cases of sickness and spasmodic cough during pregnancy, accompanied by ulceration of the uterus, which fail to yield to it; but in many of these cases it will succeed if a few doses are administered before the patient raises her head in the morning."

He states that he "has now before him twenty-three carefully recorded cases of whooping-cough. In most of these the cough came on in violent paroxysms, continued until a quantity of viscid mucus was ejected from the lungs by the mouth, and often by the nostrils, and increased in intensity until the contents of the stomach were evacuated.

"In all these cases, where the vomiting had been more troublesome than the whoop, ipecacuanha has given very marked relief.

"The dose recommended is half a drachm of the vinum ipecacuanhæ in four ounces of water, a dessert-spoonful to be taken every one, two, or three hours, according to the severity of the cough. Children under five years old should only take a teaspoonful of the same mixture, but many children of this age can tolerate, and are benefited by, much larger doses.

"In the capillary bronchitis of children, even when complicated with croupy symptoms, it acts well. In these cases the writer orders ʒss of vinum ipecacuanhæ to four ounces of water, a teaspoonful to be taken every one or two hours, or much more frequently if the symptoms are urgent.

"In many cases of nocturnal spasmodic asthma, in which hours are spent in great distress, with livid face and lips, loud wheezing throughout the chest, and want of breath, causing fear of suffocation, if there is no organic disease of the heart or the lungs, ipecacuanha will give quick and marked relief. Five drops may be taken as a dose, repeated every ten to thirty minutes for two or three hours, unless relief comes much sooner, in which case the dose should be diminished and taken less frequently. Care should always be taken to avoid its emetic or nauseating effect.

"In these affections of the lungs, its expectorant and antispasmodic character cannot be doubted, nor its curative action in controlling and stopping the abnormal secretion of mucus.

"Hemorrhage in the early stage of tubercular phthisis, and in most stages of this disease, when produced by engorgement of the bronchial mucous membrane, and accompanied by little or no acceleration of pulse or increase of temperature, is often readily stopped by ipecacuanha. In hæmatemesis arising from vicarious menses, and also in some cases of menorrhagia, it is very useful.

"In many cases of dysentery it lessens the bloody and mucous discharge, and removes the cutting pains and tenesmus, especially in the early and late stages of the disease. In cases of dysentery or diarrhœa, where nausea, vomiting, or retching exists, ipecacuanha will stop the sickness, and at least control the dysentery or diarrhœa. The watery diarrhœa during dentition, the diarrhœa with green evacuations, and the dysenteric diarrhœa, which are so common among children, rapidly yield to this drug. Vinum ipecacuanhæ is effective in dysentery and diarrhœa, but the writer has preferred the pulvis ipecacuanhæ, considering its action more speedy and trustworthy.

"It is more necessary to vary the dose in dysentery than in any other class of cases, one grain every one or two hours being quite sufficient with some persons, whereas others require ten, twenty, or more grains as a dose. These larger doses sometimes, when first administered, bring on vomiting, which it is well to avoid; but if the patient is kept lying on the back, and the dose persevered with, it can generally be tolerated, and a rapid recovery often follows.

"In the diarrhœa and dysenteric diarrhœa of children, one-fourth to one-half of a grain, with a little white sugar, at intervals of one to three hours, is generally sufficient, but the quantity must be increased if necessary."

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11. *Physiological Effects of Curara.*—Prof. PAUL BERT (*Archives de Physiol.*, No. 5, 1869) has made some curious observations on a curarized dog. After paralysis appeared, artificial respiration was started, and continued regularly by means of the ingenious apparatus of M. Gréhant. The right vagus and sciatic nerves were then exposed and tied. During the succeeding six hours the action of the nerves, the condition of the pupils, &c., were hourly observed, with the following constant results; the pupil of the right side was contracted, while that of the left was widely dilated; galvanization of either vagus caused dilatation of the pupil, with projection of the eyeball and complete stoppage of the heart's action. The left iris contracted under the action of light. An interesting result was obtained when galvanic stimulation was applied to the central portion of the tied (right) sciatic nerve, or to the median nerve, viz: contraction of the bladder, which produced, the sphincter being paralyzed, the voiding of a small quantity of urine. This effect could be produced only through the intervention of the sensory nerves of animal life; for it did not follow excitation of the vagi, the sympathetic in the neck, nor the splanchnic nerves. The interest of this observation is apparent when its value is

considered in explaining certain well-known phenomena, dependent on the relations between the bladder and the sensory nerves, such as the desire to urinate caused by a sensation of extreme cold, or by entering a bath of cold or hot water. In this experiment also Dr. Bert discovered the presence of sugar in the saliva.—*Journ. Anat. and Phys.*, Nov. 1869.

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12. *Physiological Action of Bromide of Potassium.*—Dr. Purser, of Dublin, gives (*Dublin Quarterly Journ. of Med. Sci.*, May, 1869) the general results of his experiments to determine the physiological action of bromide of potassium somewhat in the following manner: After a stage of temporary excitement, which is not, however, invariably observed, bromide of potassium destroys reflex movement, by an action on the gray matter of the brain and cord. It next destroys sensibility, also by an action on those parts of the nerve centres whose function is to receive and conduct impressions coming from the periphery. The power of voluntary motion is generally retained for a considerable period after the reflex excitability is abolished; but it is likewise eventually lost, and this occurs while the nerves and muscles are yet functionally active. The effect on the heart varies according to the dose and place of injection. If the dose be large and injected in the neighbourhood of the thorax, the heart speedily comes to rest in diastole, before the occurrence of complete suspension of voluntary or even of reflex movement; but if the dose be comparatively small or injected at a distance from the thorax, the heart continues to beat for several hours after movement of every other kind is at an end. The capillary circulation, after a temporary acceleration, becomes slow, and altogether stops before the heart ceases to beat. Respiration is one of the first functions affected, sometimes stopping almost instantaneously on the introduction of the poison; and the respiratory movements of the chest cease before those of the throat. The nerves lose their conductivity at a late period, but muscular irritability is retained for some time after this. Dr. Purser concludes his paper with an account of a few experiments made with bromide of sodium, bromide of ammonium, and iodide of potassium, which appear to show that in physiological action these substances differ considerably from each other, and from bromide of potassium. The experiments were made on frogs only.—*Journ. Anat. and Phys.*, Nov. 1869.

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13. *Physiological Action of Delphinia.*—Dr. Cayrade (*Journal de l'Anat.*, No. 3, 1869) summarizes the results of his investigations into the action of the alkaloidal active principle of delphinium staphisagria, in the following conclusions: 1. Delphinia influences the spinal cord in such a manner as to diminish and then destroy its excito-motor power. 2. This action is produced gradually, and it extends from behind forwards, reflex power disappearing first in the posterior extremities, then in the anterior, and last of all in the head. 3. Voluntary movements continue after the loss of reflex power, but the former become incoördinate before their abolition. 4. Delphinia seems to affect successively the general sensibility, the reflex function, the respirations, and the power of coördinate movements. Its action is restricted to the nervous system.—*Journ. Anat. and Phys.*, Nov. 1869.

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14. *Physiological Action of Picrotoxine.*—This active principle of *Menispermum Cocculus* has formed the subject of a recent investigation by Dr. Roeber, of Berlin (*Archiv v. Reichert und Du Bois Reymond*, 1869, Heft 1, pp. 38–68). He found that in frogs a comatose condition was first produced, and then a series of tetanic spasms, which by and by became clonic. During the stage of clonic spasm, the inspirations were greatly exaggerated, so as abnormally to inflate the lungs; and, on the cessation of each spasm, the air rushed out suddenly with a distinct sound. The heart's action is slowed and the diastole prolonged by picrotoxine. The respiratory movements are at first almost abolished, but they reappear gradually on the disappearance of the spasms. It was found that the occurrence of spasms could not be prevented by removal of the cerebrum or optic lobes; but they never appeared after separation of the medulla oblongata from the m. spiralis. When this operation was performed, picrotoxine

produced a comatose condition in which reflex excitability was retained, but no dyspnœac symptoms appeared, and the heart's contractions were increased in frequency. The spasms are, therefore, dependent on stimulation of the medulla oblongata; and the slowing and even stoppage of the heart's action, as well as the inflated condition of the frog, are caused by this stimulant action affecting the vagus-centre. Accordingly, when the vagi nerves were divided, picrotoxine exerted a less powerful slowing action on the heart. A certain degree of this action was, however, observed, which Roeber refers to an influence on the cardiac motor-centre, as it could be produced even after the peripheral terminations of the vagus were paralyzed by nicotia. Division of the vagi likewise prevented the extreme inflation of the lungs. The activity of the reflex centre is diminished by picrotoxine, and Roeber believes that this effect is due to stimulation of Setschenow's inhibitory centre in the medulla oblongata, for it is not produced after the removal of this centre. The symptoms that appeared in rabbits were the same as those in frogs, only the former animal is more sensitive to the action of this poison than the latter.—*Journ. Anat. and Phys.*, Nov. 1869.

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15. *On the Combined Action of Morphia and Chloroform.*—In his recent very interesting lectures before the College of France, Professor CLAUDE BERNARD points out some remarkable and valuable effects which may be obtained by combining the actions of morphia and chloroform (*Revue des Cours Scientifiques;* and *Bulletin Général de Thérapeutique*, Sept. 30, 1869, p. 241). Some years ago, Dr. Bernard had occasion to administer a dose of morphia to a dog recovering from the effects of chloroform, and he was surprised to observe that the morphia reproduced the anæsthetic effect of the previous dose of chloroform. More recently, this experiment was modified, so that a dog narcotized by morphia was completely and quickly anæsthetized by a quantity of chloroform very much smaller than would have been necessary to produce this effect in a dog in normal condition. It was further found, that when the anæsthesia had nearly disappeared, a second dose of morphia almost immediately reproduced it. It is well known that anæsthesia cannot be induced by morphia. This alkaloid exalts the sensory excitability, and induces torpor and narcotism; it never destroys sensibility. Chloroform, however, rapidly suspends the sensory excitability. It is, therefore, somewhat remarkable that the anæsthetic action of chloroform should be increased and prolonged by morphia. Dr. Bernard believes that this can be explained only by supposing that the action of the one substance is super-imposed on that of the other. When an animal is recovering from chloroform-anæsthesia, the quantity present in the blood is insufficient to completely suspend sensibility, although it is sufficient to greatly diminish it; but as morphia blunts the nervous sensibility, it aids the action of the chloroform, and thus a quantity of the latter, in itself insufficient to produce complete anæsthesia, becomes sufficient to do so when assisted by morphia. Bernard points out that this combination admits of several valuable applications, and that, indeed, it promises to be the best method of inducing anæsthesia. By administering a dose of morphia before commencing the inhalation of chloroform, anæsthesia is induced without any initiatory stage of excitement, and without incurring the risk of those accidents which are occasionally caused by large doses of chloroform.—*Journ. Anat. and Phys.*, Nov. 1869.

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16. *Action of Veratrin.*—A very careful investigation of the therapeutic properties of veratrin has recently been made by M. PEGAITAZ, who has published his results in the *Deutsches Archiv für Klinische Medicin* for last month. He describes its effects both when taken internally and when subcutaneously injected; and finds them almost precisely the same, being as follows: In the earlier stage, excitation; subsequently depression. Then follow in succession salivation, nausea, sensation of choking, vomiting, and usually diarrhœa. The voluntary movements become unsteady, the want of power displaying itself first in the posterior, and subsequently in the anterior, limbs; accompanying this there appeared to be a certain degree of stiffness. There were coincidently

exaltation of the reflex sensibility and diminution of the sensibility. The temperature, the number of the respiratory acts, and of the beats of the heart, were all transiently diminished. Convulsions and tetanus finally set in; but careful examination failed to discover any indications of inflammatory mischief. Experiments made with a view of testing its applicability as a remedy which might be used hypodermically, seem to have been unsatisfactory; showing that whilst it acts in this way similarly to its operation when given by the mouth, yet the injection produces very great pain.—*Lancet*, Nov. 13, 1869.

17. *On the Influence of Chloroform in Promoting Cutaneous Absorption.*—From a number of experiments detailed in the *Practitioner* for December, 1869, Dr. Augustus Waller, of Geneva, deduces the following conclusions:—

1. Chloroformic solutions applied to the skin of man and animals are quickly absorbed, and produce local and general results according to the substances employed.
2. Alcoholic and aqueous solutions are either not at all or very slowly absorbed.
3. Chloroform easily traverses the dead skin by diffusion.
4. Alcohol does not traverse the skin, but produces an endosmotic current with water.
5. Skin exposed to chloroform in a state of liquid or vapour absorbs a considerable quantity of it.
6. On traversing the septal skin of the endosmometer, chloroform carries with it a certain amount of any alkaloid dissolved in it.
7. These observations sufficiently explain the rapidity of cutaneous absorption during life, without our having recourse to any problematic influence of sebaceous matter on the surface of the skin.

In the course of his experiments Dr. W. discovered that it was necessary for cutaneous absorption that the heart's action be not in any way diminished, for if it be, no absorption takes place, even after a prolonged immersion. This is owing not so much to the absence of local absorption in the skin, as to the deficiency in the vascular action; for if we remove the skin of a part that has been immersed, we can detect in its inner surface the presence of the dissolved substance, which, however, from the deficient means of transport in the vessels around, has remained localized and inert in the system.

18. *Absorption of Iodide of Potassium by the Skin.*—Dr. Ferrand refers to a case of iodism occurring in private practice, as a consequence of the application to the skin of dry iodide of potassium. This fact, besides showing the possibility of the absorption of dry substances by the skin, affords a new means of administration of this important remedy. The case was that of a female who was attacked by inflammatory symptoms in the pelvic region, accompanied with purulent evacuations through the rectum. After a careful diagnosis, it was established that these symptoms were due to the presence of an immense pelvic abscess, occupying all the space behind the uterus and the broad ligaments. Dr. Ferrand wished to combine with the local symptomatic treatment the internal use of iodide of potassium in pretty strong doses; but in a few days very distinct symptoms of iodism obliged him to desist, although the fitness of the remedy appeared already manifested by a sensible improvement in the condition of the patient. Scarcely had the iodic phenomena ceased, when the re-administration of the iodide appeared to be justified; but it became necessary to suspend it again after three days. It was then that Dr. Ferrand thought of the application of dry iodide of potassium. With this view he made the patient put on a shirt which had been previously dipped in a solution of two drachms of iodide, and then dried. After three days this shirt was replaced by a second, prepared in the same manner; but towards the end of the fourth day the iodic symptoms recurred. These symptoms were coryza, lachrymation, a sense of weight and pain over the frontal sinuses, a sense of occlusion of the posterior nares, muscular pain extending over the whole region of the neck, constant nausea accompanied with frequent vomiting, and smart fever. All these phenomena corresponded, in fact, with those previously observed during the in-

ternal iodic treatment; and although they appeared after a longer lapse of time, when the remedy was applied externally, yet they remained more pertinaciously, showing that if the action of the medicine were a little less prompt, it acted more deeply and persistently than was the case when administered according to the usual method.—*Edinburgh Med. Journal*, Nov. 1869, from *Bull. Gén. de Thérap.*

MEDICAL PATHOLOGY AND THERAPEUTICS, AND PRACTICAL MEDICINE.

19. *Recent Researches on Phthisis.*—Dr. J. BURDON SANDERSON, well known by his important researches on artificial tuberculosis (appendix to reports of medical officers of privy council for 1868 and 1869; and preceding No. of this Journal, pp. 545–47) in a paper very recently published (*Edin. Med. Journ.*, Nov. 1869), which has especial interest at the present time, remarks: "In studying the development of consumption in man, it becomes more and more apparent that three distinct agencies are at work. Of these agencies one is so ill defined that we can only designate it a tendency. To some minds, I am aware, to talk of a constitutional tendency seems meaningless. I am not going to assert the possibility of disease existing absolutely independently of material change, but I do assert strenuously that disease may exist without its being possible to detect any anatomical or chemical basis for it. As regards pulmonary consumption, the fact of its so frequently attacking in succession several members of a large family shortly after adult life affords to me a proof beyond the possibility of dispute, that something phthisical exists in each such member. In this sense I believe in the existence of latent phthisis, but in no other. No proof has yet been given that, in individuals in whom this tendency exists, the solids or fluids are differently constituted from others. The latent condition can only be described as a tendency or liability, the nature of which is open to speculation.

"The second agency is irritation. The organs which are subject to injury are, above all, the mucous cavities which communicate with the external air. A common bronchial catarrh, not differing in any respect except its result from other bronchial catarrhs which terminate favourably, gradually assumes the characters of consumption. In the cases in which tuberculous processes originate from catarrhal inflammations of the genito-urinary organs, the same thing happens. Gonorrhœa leads to prostatitis, prostatitis to scrofulous catarrh of the bladder, which creeps upwards along one or both ureters, and produces induration and caseation of one kidney—that condition which is called renal phthisis. In both of these instances an indurative process, which ultimately becomes disintegrative—*i.e.*, a tuberculosis—begins from a simple catarrh of irritative origin.

"The third agency is that which I have designated throughout as *infection*. The word designates the fact, that whenever a chronic induration due to overcrowded corpusculation exists in any organ, it is apt to give rise to similar processes elsewhere.

"Although this is the point which artificial tuberculosis serves to illustrate, the notion does not owe its origin to the results of experiment. It was distinctly formalized at least twelve years ago by Buhl almost in the terms in which we are now disposed to accept it. Buhl, however, limited its application to cases in which there are miliary tubercles. He showed, in the first place, that in persons who die of that variety of fever which is characterized by the general dissemination throughout the body of miliary granulations (acute miliary tuberculosis), masses of induration, which have remained in the body long enough to become caseous, are in the great majority of cases to be found; and *secondly*, that in those cases in which miliary tubercles are sown over a much more limited region, as, *e.g.*, when they are confined to a single organ, they also spring from old lesions.

"Both of these doctrines of Buhl's are, I think, well established, and will be accepted by most pathologists, provided they are not overstated.

"They do not, however, include the ordinary case of phthisis, for the instances of phthisis in which typical miliary tubercles are to be found are comparatively very few in number. The position I wish to advance is that *infection* has to do with the development of ordinary consumption—in short, that Buhl's doctrine applies in a certain sense to the so-called infiltrated forms of induration as well as to the miliary.

"The results of experiment, as I have said, help us to understand this. If inoculation had produced only miliary lesions, we might have been disposed to *limit* infection to such lesions. The facts are otherwise. By inoculation you get miliary granulations in the serous membranes and in the choroid, but interstitial or diffused lesions in the liver, lungs, and other massive organs—so that here interstitial induration is part of an unquestionably infective process.

"By regarding the development of so-called infiltrated gray tubercle as infective, one gets rid of some difficulties. We are no longer compelled to accept the teaching of some of the French followers of Virchow, who restrict the term tuberculosis to what is called 'granulie,' or to draw too marked a line of distinction between cases of phthisis in which miliary granulations are present and those in which none can be found—or, with Niemeyer, to refuse to apply the term tuberculosis to any excepting certain rare forms of consumption.

"As to the word tuberculosis, obviously it would be a great advantage pathologically to get rid of it, as having no anatomical or chemical basis. At the same time, it must be admitted that it has a practical value, as implying a particular kind of malignancy. This malignancy stands in close relation to the infection of which I have been speaking, and, in particular, to that crowding together of new growth, whether catarrhal or adenoid, which is the essential character of an infective focus.

"In other words, if *tuberculous* as applied to any organic disease means anything, it means destructive induration—*i.e.*, that the organ is first hardened, and then becomes softened and indurated. This, for example, is the only respect in which tuberculous disease of the testicle, of the kidney, of the bone, and of the lungs all agree.

"Here I must leave off abruptly. In conclusion, let me observe, that in my judgment the question of specificity is not one of merely theoretical interest. The doctrine has, I believe, exercised an unfavourable influence both on the treatment of phthisis, and on the management of phthisical patients. It has led men to forget that consumption is influenced by the ordinary causes of inflammation, not only in its origin, but in each step of its progress; and that one most important aim in treatment must be to counteract this influence—not, of course, by returning to the antiphlogistic remedies of the past, nor indeed by any therapeutical interference whatsoever, but by bestowing on the treatment of acute catarrhal affections, whether of the pulmonary, intestinal, or genito-urinary mucous membranes, a great deal more care than has hitherto been considered necessary; and, on the other hand, by affording to the poor when actually suffering from acute disease of the lungs the means of placing themselves under protection without delay from the injurious action of cold or occupation."

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20. *Experiments on Animals with the Inoculation and Ingestion of Different Organic Substances, and Principally Tuberculous Products.*—Dr. Dubuisson read a note to the Acad. de Med., August 10th, on this subject. His experiments were performed with the assistance of MM. Tillaux, Villemin, and Grancher. Dr. D. gave a summary of his experiments, and drew from them the following conclusions:—

1. The inoculated matters are generally harmless: the nature of the matters employed do not influence the result.

2. They sometimes quickly produce derangements, and occasionally cause death by a sort of poisoning.

3. In some cases they produce lobular pneumonia, which is, perhaps, consecutive to the inoculation, and which may be confounded with tubercles.

4. Tubercular matters given as food produce sometimes the death of the animal as if poisoned by septic matters.

5. Generally animals fed with tubercular lungs experience some *malaise* from this unwholesome food, but they do not become tuberculous.

Our experiments show then that tuberculosis is in its nature neither virulent nor contagious as regards the animals experimented on.—*Archives Générales de Méd.*, Sept. 1869.

21. *Severe Injury to the Anterior Convolutions of the Brain without Impairment of Intellect or Power of Speech.*—Mr. FAIRLIE CLARKE exhibited to the Pathological Society of London (Nov. 2, 1869) a boy, aged twelve, who had met with an extensive compound comminuted fracture of the right parietal and frontal bones, with laceration of the brain and loss of brain-substance. The accident occurred on the 19th August. Two portions of bone, each the size of a penny, were removed; and a lacerated wound was found extending deeply into the anterior convolutions. From this wound the substance of the brain exuded, and in the course of a few days a hernia cerebri, as large as the fist, was formed. The early symptoms were those of shock and compression, but in twenty-four hours the boy began to recover sensibility, and from that time forward continued to amend. By the careful use of compresses and bandages the hernia was reduced, and the gap in the skull rapidly healed over. Mr. Fairlie Clarke drew attention to the interesting physiological fact that the anterior convolutions of the brain can be so much injured without producing any apparent effect upon the intellect, the power of speech, or the special senses.

Dr. ROBINSON referred to several cases reported as having occurred in the Peninsular War, and in which there were no marked cerebral symptoms.

Mr. HULKE stated that a case of the kind was admitted last year into the Middlesex Hospital, and did well, without impairment of the mental faculties. He had met with another case several years ago.—*Lancet*, Nov. 13, 1869.

22. *Heterotopia of the Gray Substance of the Brain.*—E. K. HOFFMAN describes, in Henle and Pfeufer's *Zeitschrift*, No. 34, 1869, the case of a woman 69 years old who laboured under incipient dementia and died with symptoms of collapse. Upon examination after death a new formation of the gray substance of the brain was detected. The anomolous gray portion was in the form of a prominent tumour of the size of a hazelnut, seated between the corpus striatum and thalamus opticus of the left side, and extending inwardly into the ventricle. There was also found in the anterior lobes of both hemispheres, imbedded in the white substance, from four to five small grayish-red spots. There were opacity of the pia mater, and a warty thickening of the other meninges, with spots of induration in the substance of the thalami and corpora striata; a diminished capacity in the ventricles, and slight adhesions of the dura mater spinalis with the pia mater. By a microscopical examination of the new-formed matter it was found to be similar in structure to the normal gray matter. In the corpora striata and thalami the ganglion cells were loaded with fat and degenerated pigmentary matter, while the spots of induration were imbedded in a very thick basement tissue, beset with numerous granular cells and amyloid granules. Upon the bloodvessels of the brain there was observed a thick coat of adventitia.—*Centralblatt. f. d. Medicin. Wissenschft.*, No. 21, May, 1869. D. F. C.

23. *Abscess of the Brain.*—Dr. MAAS (*Berliner Klinischer Wochenschrift*, 1869, Nos. 13 and 14), describes four cases of abscess of the brain. In one, it was doubtful whether the fluid collections found in the anterior portion of the left lobe of the cerebrum were not more properly speaking the result of the softening of a tumour (*Myxosarcoma*), than a true abscess. In two cases, examination after death revealed a number of abscesses which occurred in cases of mortification after the operation for resection of the head of the femur, at the hip-joint. In the two remaining cases, there was traumatic injury of the skull. In both the trephine was employed. In one the contents of the abscess, which

was very large and seated in the right cerebral hemisphere, were not discharged. In the other case free exit was given to the contents, but after a while the flow of pus suddenly ceased, but the discharge was reinstated by enlarging the opening. The patient, a male 23 years old, finally recovered. A bone plate was applied to close the opening in the cranium.—*Centralblatt. f. d. Medicin. Wissenschft.*, No. 29, June, 1869. D. F. C.

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24. *Sleep apparently continued for more than Seven Months; Simulation of Death.*—The details of this case are given by M. Legrand du Saulle in the form of a lecture, and are of unusual interest.

The patient, Della F., was an Italian, aged 32 years, tall and healthy, employed for several years in the same store as porter, where he had always borne a good character for honesty, industry, and sobriety; but was somewhat retiring in disposition, and miserly in his habits. In June, 1868, it was noticed that his manner had become preoccupied, absent, and strange; later, great restlessness manifested itself, and it was evident that he was labouring under religious excitement. In July his peculiarities had increased and he began to neglect his work. On the 31st of July he seems to have become a raving maniac, for abandoning his occupation and taking with him 1500 francs—the savings of many years—he promenaded the streets, talking and gesticulating wildly, and finally threw his money into a dirt cart which happened to pass by. While kneeling in the street he was run over by a carriage and sustained a fracture of the fibula. He was at first taken to the Hôpital Beaujon, but was afterwards transferred to Bicêtre and placed under M. Du Saulle's care. The following note was made at the time of his admission: "He was uneasy, anxious, and much overcome. He scarcely answered any questions, and manifested a desire to die and at the same time a fear of dying as well as of being eternally damned. He ate little—wept, bewailed his lot, and scarcely slept. Very soon after his admission he was visited by the priest, who seems, by his injudicious exhortations, to have increased very much the religious excitement under which he was labouring. On the 8th and 9th of September he partook of the communion, and afterwards extreme unction was administered to him. On the 10th the patient was found in the attitude of a man in a profound sleep, and this condition seems to have begun at the time of, and to have continued since, the administration of extreme unction." On the 11th the following note was made: "Della F. is in the dorsal decubitus, his limbs are rigid and contracted, his respiration is frequent and rather diaphragmatic than costal; his pulse is 72; his eyelids are drooping and occasionally winking, and his jaws are tightly closed one against the other. The sensibility is blunted; immobility absolute since yesterday. The patient has several times passed his urine involuntarily." The condition above described continued unaltered, except that later the sensibility of the skin seemed somewhat increased. It was evident, however, that there still existed a state of semi-consciousness, and to a certain extent the power of voluntary action. "For, whenever the patient believes himself alone and unwatched he puts his left hand from under the bedclothing in search of the sheet, which he seizes and throws over his head, and this action he repeats as often as the sheet is rearranged."

In regard to the diagnosis M. Du Saulle thus expresses himself: "The patient is, in my opinion, a victim to a sort of internal delusion; the sacrament has been administered to him; he either believes himself dead or wishes to be thought so; he obstinately throws the sheet over his head and maintains, without the least movement, the position of a corpse in a coffin." By the advice of M. Luys, one of the physicians to the Bicêtre, a large blister was on Nov. 4 applied to patient's scalp; while it was drawing, he suddenly assumed the erect position, and with a voice broken with sobs, exclaimed, "My God! my God! have pity on me! I am undone, I shall die. My God! my God! I shall die, my brethren! Pray to God for the repose of my soul." Before, however, the nurse could light his lamp he had fallen back on his pillow and had assumed his usual posture. During all this time it was of course necessary to feed him by introducing food through an œsophageal tube.

On the first of February he was etherized. Drunkenness was produced

with great difficulty—was very slight and passed away rapidly, although the operation was very well performed. While under the influence of the ether he seemed uncomfortable—made movements as if he intended to put himself on the defensive; opened his eyes wide and looked at what was going on around him with an astonished and stupid expression, and on two different occasions laughed in a silly manner. During the time that the drunkenness lasted (eight or ten minutes) he was questioned, teased, flattered, and threatened alternately, but he could not be induced to answer a word. Little by little, as the effects of the ether wore off, he assumed his former attitude. Three days later the attempt was made to intoxicate him, and for that purpose a whole bottle of champagne was introduced into his stomach, but the only effect produced was increasing slightly the frequency of the pulse. Cannabis Indica was about this time employed without any other effect than that of increasing the emaciation and causing a discolouration of the skin. The sleeper of Bicêtre having by this time become famous, a notorious magnetizer succeeded, by an application to M. Husson, the Director-General of Public Charity, in gaining access to the wards of M. du Saulle, and in magnetizing the patient; but no results appear to have followed the *passes* which were made over him. An ophthalmoscopic examination made by M. Edward Meyer and M. Bouchut revealed the fact that there was œdema of the optic nerve, and abnormal pallor of the retinal vessels.

On the 12th of April the patient succumbed to an attack of pneumonia.

The autopsy appears to have been made with unusual care, and the following points are of interest: 1st. A marked decoloration of the nervous substance affecting both the white and the gray substance depending upon a general anæmia of the organ which was very apparent even where the bloodvessels are normally most abundant, as in the gray substance of the corpus striatum, the protuberance and cortical substance. 2d. Atrophy of some of the convolutions, which caused in certain positions umbilicated depressions of the undulatory surface of the cortical substance. This condition is never met with except in those who have presented during life persistent trouble, more or less characteristic of the mental faculties, and as it depends upon disappearance to a certain extent of the nervous cellules, this derangement is generally of the nature of dementia. 3. Islets, of partial vascularization, which were found in the thickness of the cortical substance. These were said to resemble, more than anything else, the eruption of measles on the surface of the skin. M. Luys, who conducted the post-mortem examination, is inclined to think that the excessive depression of the phenomena of the life of relation and the apparent absence of all cerebral activity may be explained by the progressive diminution of the capillary circulation through the groups of nervous cellules which induced a condition of positive inanition, and finally extinction of their dynamic activity. On the other hand, the persistence of delusion may be explained by the existence of the foci of partial congestion which kept the surrounding cellules in a state of erethism or of functional exaltation.

One of the most interesting facts in the whole case is, that notwithstanding the number of times the œsophageal tube was introduced (750 in all) not the slightest abrasion of the œsophagus was found after death.

The lecture also contains the full history of a very similar case reported by M. Timermans, of Turin, and some particulars in regard to four other cases, which present some points of similarity.—*Gazette des Hôpitaux*, Nov. 2, 4, 9, 11. J. H. H.

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25. *Sudden Death from Excitation of the Pneumogastric Nerve, of the Inferior Laryngeal, or of the Nasal Nerve.*—M. P. BERT, in a note read Aug. 23d, 1869, to the French Academy of Sciences by M. Claude Bernard, states, that when these nerves are strongly excited sudden death may result, without convulsions; respiration and the general movements of the body are immediately arrested and the animal dies as if from a stroke of lightning. M. B. has thus caused death in mammifera and birds, particularly in ducks, which is an important fact, for the suddenness of the death in these last animals shows that it is not owing to asphyxia (ducks resisting asphyxia for from eight to fifteen

minutes). This sudden death is hence probably the result of a cessation of action, of a sideration from too strong a centripetal excitation of the respiratory centre to which the term *vital* point, so much criticized, would be partly justified. However this may be, certain cases of sudden death following too strong excitation of the larynx (ammoniacal cauterization, small foreign bodies) to some attacks of angina pectoris may, perhaps, be thus explained.—*Gaz. Hebdomadaire de Méd. et de Chir.*, Sept. 3, 1869.

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26. *Reduplication of the Sounds of the Heart.*—It has been erroneously asserted that the reduplication of the second sound of the heart has no prognostic or diagnostic importance. Dr. A. Geigel admits that this symptom is occasionally met with in healthy persons, but he asserts that it is constantly found in a series of patients affected with mitral narrowing and insufficiency. Most of these patients are of middle age, thin, anæmic, and long affected with cardiac disease. In all these a reduplication of the diastolic sound can almost constantly be heard at the points where the tricuspid orifice, the aorta, and the pulmonary artery are auscultated. The two diastolic sounds are more intense over the aortic and pulmonary orifices than over the mitral; the second diastolic sound is also more marked over the situation of the pulmonary orifice than over that of the aortic. The reduplication of the diastolic sound may thus be explained by the occlusion of the semilunar valves of the aorta and of the pulmonary artery not being simultaneous, the valves of the latter closing an instant after the valves of the aorta. In fact the second diastolic sound is more accentuated over the situation of the pulmonary artery than the first.

The retardation of the closure of the pulmonary valves is due to the left ventricle relieving itself rapidly of its blood, while the right ventricle gorged with blood empties itself more slowly. Further, the aorta retracts more energetically and more rapidly than the pulmonary artery, the elasticity of which diminishes from day to day in proportion as the sanguineous engorgement increases. A constant reduplication of the second sound of the heart may serve as a diagnostic sign of the mitral narrowing or insufficiency, but the reduplication of the second sound of the heart may also be produced in all cases in which there is a stasis in the right heart, or dilatation of the pulmonary artery. It is manifest that in this latter case the symptom will not be so constant as when there are valvular alterations. Reduplication of the diastolic sound is also observed in young, robust persons affected with tuberculosis, in those who are emphysematous, in pleurisy, and in fatty degeneration of the heart.

Guttmann, without denying the assertions of Geigel, nevertheless attributes much less importance to the sign in question. He does not consider the reduplication of the second sound of the heart as an habitual sign of mitral contraction; on the contrary, he regards it as a rare phenomenon, never constant, and only to be observed when the patient is in complete repose. When the heart is excited to full activity, the reduplication disappears.—*Archives Gén. de Méd.*, June, 1869, from *Verb. de Worzb. Med. Gaz.*, and *Virchow's Archives*, 1869.

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27. *The Urine in Yellow Fever.*—The urine of yellow fever patients has been most attentively examined with the hope that it would furnish a means of diagnosis and prognosis. The experiments of Dr. Ballat in three hundred cases satisfied him that during the first stage of yellow fever the physical and chemical characters of the urine are the same as in other fevers. But in the second stage the urine, as the disease becomes developed, assumes more or less of a deep brown colour and viscid consistence. Subjected to nitric acid or heat an albuminous precipitate is obtained; the abundance of the albumen varying according to the progress of the disease. If the termination is to be fatal, it increases until death; if favourable, the amount of albumen gradually decreases.

Dr. Vidaillet has published in the *Archives de Médecine Navale* (1869), some additional observations, and insists on the value of albuminuria as a means of diagnosis. He states that there occur in the Gulf of Mexico, where yellow fever prevails, two other fevers, bilious remittent and intermittent fevers,

the symptoms of all three of which at their onset are the same, but require very different treatment. Hence the importance of discovering a means by which yellow fever may be diagnosticated. Dr. V. sought for this desideratum in the modification of the urinary secretion. He remarked that as the quantity of urine diminished the urea and uric acid also diminished, and at the same time albumen could be detected, at first, however, only in small quantity. As the quantity of albumen increased, the traces of urea and uric acid diminished, and ultimately entirely disappeared, as did also the colouring matter of the bile.

Dr. V. has observed that when into a glass containing about 150 grammes of urine, passed by a man twelve or twenty-four hours after an attack of yellow fever, some drops of nitric acid be poured along the sides of the vessel, there is immediately or a few moments afterwards, found a whitish albuminoid zone, dividing the fluid into two parts; the upper layer consists of urine the colour of which is unaltered, the lower layer has a reddish tint, while the lowermost portion of all has assumed a yellowish-orange, or curaçoa colour. This whitish opaline zone, which Dr. V. calls the premonitory ring, he considers as the least doubtful diagnostic sign at the commencement of yellow fever, one which is never found in the two other fevers. It may vary in thickness; it is soluble in an excess of acid, or rather it becomes of a greenish-brown from below upwards. According as it disappears the urine becomes effervescent, and this effervescence is an additional important character, for it occurs only at the commencement, or at the decline of the disease when it is to terminate favourably.

The examination of the urine of a great number of cases, enables Dr. V., he states, to assert that when the ring does exist, the case is not one of yellow fever. He has further observed, that the albumen can be detected twelve hours after the ring occurs in the urine. The albumen undergoes modifications according to the progress of the disease; at first it floats, afterwards it becomes denser, and finally is precipitated to the bottom of the vessel by nitric acid. At first it is opaline, almost transparent, requiring some amount of the reagent to determine its presence; afterwards it is so dense that a single drop of the acid suffices to produce a precipitate like pus, the albuminous coagulum at this time is no longer homogeneous, but is composed of distinct milky-white granules. When the disease is going to terminate favourably, the albumen recommences to float, and passes through the successive transformations which it had previously undergone, from the ring at the onset of the disease, which he then terms the ring of decline (*retour*); and the colouring matter of the bile reappears, exhibiting its characteristic colours; at the same time there may be noticed a return of the effervescence: all these concur with the diminution in frequency of the pulse, which falls below 60, prognosticating the favourable termination of the disease.—Condensed from *Archives Générales de Médecine*, November, 1869.

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28. *Hemorrhage from Mouth and Anus of New-born Infants.*—Dr. SPIEGELBERG, in a recent number of the *Jahrbuch für Kinderheilkunde*, relates two cases of the so-called *melæna* in new-born infants. In both instances the infants were to all appearance healthy at birth. In one, on the fourth day, and in the other after thirty hours, there occurred a copious discharge of blood by the mouth and per anum. In both cases death ensued within a few hours, under symptoms of anæmia. Upon post-mortem examination, in both cases there was found in the duodenum ulcerations from the size of a lintseed to that of 1 cm. long by ½ cm. broad. Dr. S. refers these ulcerations to a diseased action commencing during uterine life.—*Centralblatt. f. d. Med. Wissenschft.*, September, 1869. D. F. C.

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29. *On Feeding by the Nose in Fever.*—Every physician must be familiar with a complication of fever, especially typhus, which frequently occurs, viz., real inability, or obstinate refusal from delusions, to swallow the milk, beef-tea, etc., so absolutely necessary to successful combating of the disease. Mr. TENNENT, of the Glasgow Fever Hospital, recommends (*Glasgow Medical Journal*, November, 1869) in preference to all the artificial methods heretofore adopted,

that of nasal feeding, by passing a gum-elastic catheter through the nose into the œsophagus, and then using an ordinary glass syringe. The nasal passages present an entrance over which the patient has no control whatever, either during or after introduction. The only conditions to be attended to in its use are: 1st. To oil it. 2d. To see that it is not too flexible, as if so, it is apt to bend in all directions and thus be more difficult to pass. 3d. To remember that it may be passed into the larynx; its presence there generally produces irritation and coughing; and, moreover, air passes through the catheter. 4th. After the catheter is introduced, to watch that it does not slip back through the nares. A string attached to the catheter will guard against this possibility. 5th. If the catheter is not readily passed by the one nostril, try the other.

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30. *Uræmic Diarrhœa.*—Dr. J. M. Fothergill remarks (*British Med. Journ.*, Nov. 20, 1869) "In congestion of the kidneys, the flow through the convolute capillaries is impeded, and the excretory action of the kidneys is thus lost, and the blood becomes laden with effete products and water; thus altered in its physical properties, it flows sluggishly and stagnates in the capillaries, including those of the intestinal canal; spontaneous catharsis comes on, and the balance of the circulation is restored. In chronic renal disease, this becomes more necessary, and is frequently manifested. The inefficient action of the renal secreting cells, together with dilated, constricted, or thickened capillaries, produce frequently an impeded circulation; congestion and further impeded flow follows; the depurative action of the kidneys, for the time being, is held in abeyance; and blood-poisoning ensues."

Diarrhœa, therefore, in these renal conditions, Dr. F. considers to be of greatest service, freeing the blood from its retained effete products.

"Whenever, then, diarrhœa occurs in a person," he says, "presenting the appearances of renal disease, and more especially if there be present albuminuria, or the symptoms of any renal congestion, it may be desirable to hesitate about arresting the alvine flux until some other channel be patent. From the known intolerance of opium in renal disease, preparations of the solanaceæ should be administered where the suffering is great. The skin should be immediately acted upon by the hot air bath, or otherwise; hot poultices, sprinkled with mustard, should be applied across the loins when the bath is over. Nutritive support should be given; and a mild diuretic of digitalis, and citrate of potassa in infusion of buchu or calumba, may be administered as soon as the kidneys are somewhat relieved. If a little flux remain, a few grains of powdered cassia or cinnamon may be prescribed, and the more powerful astringents should only be administered when the danger to life is imminent; and, of these, a mixture of sulphuric acid and infusion of logwood, is perhaps the least objectionable. But astringents should be used warily and cautiously; absorbed into the blood, they astringe and arrest the activity of the bowels, but, at the same time, check and impede the action of the renal secreting cells, whose restored and renovated activity it is of the utmost importance to keep up. The action of the skin must be fostered, and the patient carefully protected from atmospheric changes, to which these sufferers are very sensitive; and, as soon as convenient, the patient must be given steel, and the other adjuncts to nutrition. In the first mild case which occurs, I shall feel inclined to try a combination of nitrate of potassa, nitric ether, and pernitrate of iron. Whichever plan be adopted, it is desirable, while affording the maximum amount of benefit, to eliminate, as far as possible, the elements of danger."

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31. *Scleriasis.*—Dr. John K. Barton records (*Dublin Quart. Journ. Med. Sci.*, Aug. 1869) a case of this rare disease, of which three cases, it will be remembered, were reported by Dr. Arnold in the No. of this Journal for July, 1869.

M. J. C., a girl æt. 23, was admitted into Adelaide Hospital, in April, 1869, "on account of a hoarseness, and feeling of pain, and constriction in her throat, which had then lasted about three weeks, and seemed to be increasing in intensity. Upon examining the throat externally, the neck was found to be the seat of a peculiar kind of diffused induration, which extended across the larynx in front,

and laterally as far back as about the edge of the trapezius muscle, the back of the neck feeling natural; the larynx seemed to be the centre of this induration, and felt larger than natural, while at the same time its prominent cartilages could scarcely be distinguished. When pressed, the patient complained of pain, but the swelling at all other parts of the neck was painless; the affected skin was pale, and of natural temperature. Upon further examination the induration was found to extend down over the skin of the chest as far as the mamma, the upper part of which was hard, but the skin over the lower part of these glands was supple and healthy. Upon turning to the face to see if the disease had involved it at all, it became apparent that the skin over the entire face had a smooth, tightened, peculiarly drawn look, which made it almost impossible to pinch up the skin, and gave a remarkable expression to the countenance. When told to frown, the patient's utmost efforts could only produce a slight wrinkling of the skin of the forehead, while smiling produced creases around her mouth, such as might be the result of folding parchment.

"The only history the patient could give was, that about four months previously she had begun to find her strength and appetite failing; she was at times sick after meals, sometimes vomiting; she suffered at the same time pains in the shoulders and back, which were worse at night. Three weeks before applying for advice she had felt some difficulty in swallowing, and at the same time began to lose her voice. This increased slowly until she was not able to raise her voice above a whisper; she became at the same time troubled with a constant cough; she was admitted to the hospital upon the 29th of April. Within a week after her admission the peculiar hard swollen state of the integument had extended round from the anterior and lateral region of the neck to the back of the neck and shoulders—where its characters were very marked—the affected integument felt brawny, like the skin of the swine; it could not be pinched up. At this time the colour was perfectly natural, but it subsequently became of a yellowish tinge; no pressure would make it pit. The treatment adopted upon the patient's admission to hospital consisted of small doses of Grey and Dover's powder internally, and the *Lin. Hyd. Camph.* externally, rubbed over the whole of the affected skin once a day. Within a week the voice had become nearly natural, and the patient declared herself much better. A note taken upon the 8th of May, states that 'an improvement has taken place in all the symptoms; the hoarseness has nearly altogether disappeared, and the peculiar drawn expression of the countenance does not exist to the same degree; the patient no longer complains of tightness of the throat.' The skin over front and sides of the neck, which had been chiefly affected, gradually became softer and more natural, and could be pinched up, but at the same time the back of the neck which, when the patient was admitted, was free, remained markedly affected, and the whole skin over both shoulders and scapulæ, and over the deltoid region on both sides; the induration gradually decreased down the arm, until at the elbow the integument felt natural, but upon the back of the right forearm, a patch of skin about the size of a crown piece was indurated in the same way as the rest of the diseased integument. When the arm on either side is moved up and down, the movements of the scapulæ are not seen as usual beneath the skin; they are, as it were, concealed by the thick integument, and when the hand is laid on the part and the scapulæ moved, this became very evident to the touch. No improvement took place in the state of the skin over the back and shoulders before the patient left hospital, but the face became less drawn in its expression, and at the same time got a furfuraceous look, the cuticle coming off in small heavy scales. She left hospital upon the 29th of May, and returned to her employment of book-folding. There was not at any time any inflammatory or feverish symptoms whatever. The sensibility of the affected skin was tested upon different occasions; it was diminished, but not very much so in any part. The lower part of the body remained quite free from the disease. The urine was free from albumen, and the menstrual functions were healthy."

"The natural course of this disease," Dr. Barton remarks, "appears to be, slowly to extend for some months from the point where it begins (usually the neck), and slowly to subside and disappear. The subsidence begins, as we

might expect, in the part first affected, and the improvement extends very gradually to the parts subsequently affected. In several of the continental cases, the patients have been kept under observation for years, and a gradual improvement, and finally a disappearance of the disease took place without any treatment beyond that adopted at first, and which was not very active. The rapidity with which the symptoms have appeared and progressed varies considerably; in most cases two or three weeks elapsed before the disease was decidedly established, and then as many months before any subsidence took place; in some, years elapsed without any decided change; in one of Dr. M'Donnell's cases the disease had existed a year, and the patient remained under treatment for more than a month without any improvement whatever. In one case only has an opportunity of examining the pathological anatomy of this affection been afforded. Forster, who made the examination, thus sums up his observations: 'The scleroma of this case was characterized by a chronic process of proliferation in the connective tissue of the corion, and particularly of the subcutaneous tissue, unattended with fever or local inflammatory symptoms;[1] the fat usually present beneath she skin had completely vanished, being replaced by the hypertrophied connective tissue. The treatment hitherto adopted, although including a great variety of local applications and internal remedies, has not seemed to make any change whatever in the disease."

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32. *Discussion on Vaccination.*—The Imperial Academy of Medicine has been engaged in a protracted and exhaustive discussion regarding vaccination. The editor of *L'Union Médicale* (Jeudi, 9 Sept. 1869) gives, in the following propositions, the practical results of this elaborate debate.

1. That the degeneration of the Jennerian vaccine has not been proved.
2. That there does not exist a single authentic case of vaccinal syphilis, properly so called.
3. That the rare—very rare cases of syphilis inoculated by vaccination are explained by conditions which completely exonerate the vaccine from all influence therein.
4. That a great number of cases of pretended syphilis occurring after vaccination are exceedingly doubtful.
5. That animal vaccination, as a source of vaccination, may be encouraged, although it does not possess any real and sensible advantage over vaccination from arm to arm.

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33. *New Uses of the Hypodermic Syringe.*—At a meeting of the Society of Physicians in Vienna, June 5, 1868, Dr. Mader spoke of the usefulness of this instrument for drawing out liquids for diagnostic and other purposes. *Allgem. Med. Central Zeitung*, No. 50, 1868.

He has made use of it for the purpose of obtaining blood for examination from cholera patients, and in making a diagnosis in a case of ascites, in which a doubt existed whether chronic peritonitis or cirrhosis hepatis caused the dropsy. The character of the liquid proved it to be a case of cirrhosis. In another case, an abscess in the region of the shoulder, with secondary venous congestion, was emptied with the instrument. He also pumped out a chronic serous exudation from the pericardial sac of an aged female: the first operation yielded a few ounces of liquid, and relieved the urgent symptoms; at a second trial, three ounces were removed. The patient died soon afterwards, as she had also hydrothorax. Mader thinks that the operation deserves much regard, as it is easily performed, and attended with comparatively little danger. Autopsy revealed the two spots of puncture in the pericardium cicatrized; they had produced no injurious consequences. In future operations the canula should be provided with a stopcock, so that air may not enter when the body of the syringe is detached in order to empty it; and the body of the syringe might be made of greater capacity.

He furthermore used a similar syringe for the operation of transfusion, and

[1] Guy's Hosp. Rep., vol. xiii. p. 313.

performed this by plunging the sharp canula into a vein turgesced by pressure; superficial veins were chosen. In order to avoid throwing the blood into the cellular tissue, he recommends that a few drops from the vein be first allowed to escape from the detached canula; when this has taken place we may be sure that the vein has been entered, and we then attach the body of the syringe and gently throw in the blood, or other liquid used for transfusion. He injects at several spots until enough has been entered, and says that patients submit to repeated punctures much more willingly than to the operation of laying bare the vein selected, and then opening it for the application of the syringe, which not only appears more formidable to them, but may be followed by phlebitis.—*Edinburgh Medical Journal*, November, 1869.

34. *Heat Apoplexy treated by Large Doses of Quinia.*—Mr. W. K. WALLER directs attention (*India Medical Gazette*, July 1, 1869) to the remarkably successful treatment of heat apoplexy by quinia. In India the mortality from heat apoplexy is more than 50 per cent., while by the treatment by quinia the success so far has been constant. The quinia is to be given in large doses by the mouth, or hypodermically if the patient is unable to swallow. "Probably," Mr. W. says, "the hypodermic method may prove to be the best and most convenient means in all cases, it is at least applicable to all in *any* stage.

"I am enabled, through the kindness of my friend Dr. Hall, R. A., to give a case of recent occurrence in which its success was most marked. The precise means of supplying the remedy will appear from the cases cited. I have as yet said nothing of cold affusions. I use it in almost all cases where there is great heat of surface; that it is not absolutely necessary is seen from Dr. Hall's case, and another which I shall give from my own experience. In cases of the cardiac variety, with cool and moist skin, it is of course inadmissible. Cold affusion is a valuable aid, but the remedy pure and simple is *quinia*. I give two cases of cerebro-spinal form:—

"H. B., gunner of the *Golconda*, admitted into the P. & O. Hospital at half past six P. M.

"26th May, 1866.—He had fallen from his seat whilst at tea. The surgeon who was called to see him applied ice to the head, leeches to the nape of the neck, and gave a powerful purgative, which took no effect. I saw the man almost directly after admission. He was speechless, his skin burning hot, pulse running, hardly to be counted; he could still swallow. I gave him ℈j of quinine at once, and ordered 10 grains to be repeated every hour till he spoke. I considered him a most unpromising case; after the second 10 grain dose he spoke; nevertheless my apothecary continued the quinia, so that, by the time I paid my early morning visit, the man had taken 70 grains. He was then cool, sensible, able to sit up or even walk about, could speak, and complained of headache; the quinia was continued in five grain doses, at gradually increasing intervals, and the man was discharged on the 9th of June to his duty. The *Golconda* sailed for Suez that morning, the man had been kept in hospital, though well some days before, as a matter of precaution on account of the great heat. For the following case I am indebted to Dr. Hall, R. A., whose notes I abbreviate:—

"T. B. Driver, R. A., being in the hospital for ague, and being treated for this disorder by cinchonia, was attacked at 5.30 P. M. on the evening of May 15th, with heat apoplexy. Dr. Hall found him perfectly comatose, pupils rather dilated (a sign of approaching death), skin burning hot, pulse full, 134, convulsive movements of arms and legs, grinding of the teeth, and gurgling in the throat. Three grains of quinia were at once injected under the skin near the deltoid, one and a half grain into each arm; in half an hour the convulsive movements were less, and he seemed better. In an hour he was able to swallow, and had 10 grains quinia given in water. At 8 P. M. he had ten grains more, the convulsive movements had then ceased, pulse about the same. At 10 P. M. 10 grains more. He was then conscious, and said he felt better. At 1 A. M. he was sleeping quietly. On the 17th, says he feels all right, has no headache; is to have five grains of quinia three times daily.

"27th.—Up to date no bad symptom, no return of ague, is quite well, and discharged to light duty.

"Now, both these cases are remarkable, because in them the quinia was the only remedy used. In both cold water was very partially employed, but in no such manner as could be classed as cold affusions. Quinia and that only saved these men. The three grains hypodermically injected may be taken to represent 12 grains given by the mouth.

"I will now briefly give two cases of the cardiac form of insolation, in which the remedy was equally successful.

"In March, 1856, the 2d officer of my ship *Nubia* went on shore at Galle with the captain to take sights by means of the artificial horizon. He was on shore about two hours, exposed to the early morning sun with a small cloth cap only as a head-dress. Returning on board, he went to his cabin, and sent for me. He complained of intense headache and inability to sit up or stand, his pulse was slow and laboured, his skin cold and clammy, he was very pale. I gave him 10 grains of quinia at once, and repeated the dose in two hours. He was quite relieved by the afternoon.

"Again, an artilleryman marched with his comrades from the artillery station at the Mount into Madras for embarkation on board the *Nubia* in January, 1858. The march took place between 3 P. M., and sunset. The men were all in thick cloth clothing and forage caps. This man was brought to me at once on coming on board. His symptoms were identical with those given above. He had two ten grain doses of quinia at an interval of two hours, and was well the following morning."

Mr. W. gives a table of 31 cases, 28 of which were treated by quinia and recovered; the three fatal cases were not so treated. The following cases are communicated to the same journal by other practitioners:—

Case communicated by Surgeon G. H. Daly, Officiating Garrison Surgeon.—Private F., 26th Foot, admitted into the receiving room garrison dispensary, 10.30 A. M., on 15th June with heat apoplexy, the symptoms of which were first observed by his comrade.

At 11 A. M., when seen by me, the following symptoms were present: Very stertorous and heavy breathing, without puffing, unconsciousness, intense heat and dryness of head and body generally, bounding pulse, convulsive movements of limbs, dilated pupil.

Twenty grains of quinia were given in solution at once, ice was applied to the head, and iced water splashed over his chest and face at intervals of a few seconds; to have ten grains of quinia every hour. At noon his bowels had acted freely from an enema given on admission; he was now conscious to the application of cold water to his chest and face, starting up at every splash, but he was delirious, and unable to articulate.

At 1 P. M., breathing heavily but less laboriously, skin burning hot and dry, pulse full and strong, 120, semi-conscious, answers when loudly spoken to; ordered the body to be sponged with diluted acetic acid.

At 4 P. M., had taken 40 grains of quinia, is now conscious and answers coherently, complains of frontal headache, skin hot but moist, pulse quick but less full.

At 5.30 P. M., he was so much improved that he was sent to the general hospital.

Assistant Surgeon Carpenter, 26th Foot, was good enough to communicate his state to me on the following morning: "Slept half the night through, skin, pupils, &c., natural, tongue furred, pulse 94, compressible, complains only of dizziness when he sits up." No relapse occurred, and strength gradually returned.

Abstract of two cases of Heat Apoplexy treated with Quinia, by Assistant Surgeon E. O'Sullivan, 9th Regiment.—Since the early part of May last up to the present date, four cases of heat apoplexy occurred amongst the men of H. M.'s 96th Regiment, stationed at Dum-Dum.

The two first cases were treated in the usual way: cold applications to head, leeches, &c.; both the cases were fatal.

Cases treated with Quinia.—No. 1, S. R., Private, 69th Regiment, brought

to hospital at 6 P. M., 10th of June, from the Main Guard, where he had been confined for a couple of hours; had been made a prisoner of in the bazaar, where he was found drinking; he was in a semi-comatose state, and spoke with difficulty when aroused, complaining of pain in his head.

6.40 P. M.—Perfectly comatose, pupils dilated; skin hot; pulse full, 130; can swallow with difficulty; 10 grains of quinia given at once, to be repeated every second hour. A solution of five grains of quinia was made and at 7.30 P. M. one half of this solution was injected into the right arm at insertion of the deltoid muscle, the other half was injected into the left arm, to be repeated every hour.

In this manner he had fifteen grains of quinia, and twenty grains by the mouth, and at 10.30 P. M., the patient was conscious.

11 P. M.—Can speak; had some lime juice and water.

12 P. M.—Dropped into a sound sleep.

11th June.—Feels slight headache, otherwise pretty well.

22d June.—Quite well.

No. 2, D. S., Private, 96th Regiment, was on sentry at the hospital. About 5 P. M., 13th June, he suddenly left his post, and rushed in the direction of the hospital guard room, where he was arrested, and brought into hospital.

6.30 P. M.—Quite insensible; nearly outrageous, requiring three or four men to keep him in bed; pupils very much dilated; extreme sensitiveness of the body; eyelids open; muscular spasms frequent, and very powerful, with grinding of the teeth; pulse small, 140; skin cool and dry; unable to swallow. A solution of quinia, same strength as in the case No. 1, was immediately injected, 2½ grains into each arm; this was repeated in half an hour.

7.15 P. M.—Spasms completely disappeared, lying quietly; cannot swallow. The injections of quinia to be repeated every hour.

10.30. P. M.—Patient slightly sensible, but upon being roused, falls into a heavy stupor.

11 P. M.—Complains of great pain in his head, and extreme thirst; had some lime-juice and water.

In this case, there were twenty-five grains of quinia injected.

14th June.—Much better; pain in head still continues; ordered leeches, calomel, and antimonial powder.

15th.—Has hæmaturia, urine being ammoniacal.

22d.—Doing very well; can walk about the ward.

Both of these cases, previous to my arrival at the hospital had cold applications to head, cathartic enemas, and leeches administered, but I am of opinion that the cure is due to the quinia.

Case communicated by Dr. Waller.—J. S. Steward, admitted 16th June, 3.30 P. M., had been working in the sun with a thin straw hat on; on leaving the deck to go below fell senseless to the bottom of the ladder. On admission, was comatose, struggling, clenching his fists, and biting his lips, respiration embarrassed, pupils contracted, skin burning hot.

Cold douche was applied and ten grains of quinia given by the mouth, and repeated hourly for three doses.

On the following morning he was sensible, cool, with a good pulse, but hesitated in his speech, which was not a natural condition. He complained of headache. A large mustard poultice was applied to the nape of the neck, and quinia in five grain doses given. On the 18th he was free from pain and stammering, and was discharged on the 19th.

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35. *Hæmoptysis arrested by Hypodermic Injection of Ergot.*—Dr. Drasche has successfully treated two cases of hæmoptysis by the hypodermic injection of two grains of the extract of ergot in twelve grains of distilled water. The hemorrhage was arrested almost instantaneously.—*Gaz. Hebdom. de Med. et de Chirurg.*, Sept. 17, 1869, from *Bericht. d. Krankenanstalt » Rudolph-Stiftung. f.* 1867, and *Gaz. Med. Ital. Lombard*, No. 25, 1869.

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36. *Bromide of Potassium in Epilepsy.*—Mr. D. M'Gregor, late Medical Superintendent, Barnhil Hospital and Asylum, Glasgow, states (*Ed. Med. Journ.*, Oct. 1869): "I have never yet been able to *cure* a single case of epi-

lepsy by this drug; yet I have found it a most valuable agent in its mitigation and relief. Nay, I have in several instances kept the disease quite under control while its administration was continued. But however long this might have been done, on its withdrawal, or soon after, the dread disease reappeared, not with such violence at first, but increasing in severity as the time from the discontinuance of the bromide increased. The dose in which I usually prescribe it is a scruple three times a day to begin with. This I increase, if need be, by increasing the number of times a day in which it is given, till, in some very bad cases, a scruple is administered every two hours. Except in two cases, I do not remember of having seen bad effects from it. In these a papular rash appeared on the face, with heat and itchiness, more particularly on the nose; and in one case diarrhœa was caused by it. The first two cases in which I noticed marked beneficial effects from its use were a female inmate of the asylum, aged about forty, suffering from delusional insanity, with severe epilepsy; and in a young woman of eighteen, not insane, but becoming silly and demented by the violence and frequency of her fits. In both cases, the fits were very severe, occurring in the girl one to six times almost every day for some time before coming under treatment, and in the woman two or three times a day, but only periodically, lasting about a week at a time, generally at the monthly periods. The effect of the bromide on the young woman was distinctly noticed a few days after its exhibition. The fits became more seldom, and when they did come they were not so severe, lapsing soon into mere nervous tremors and confusion of intellect, with giddiness in the head, instead of convulsions and unconsciousness. Ultimately they ceased altogether, on a scruple dose thrice daily. The medicine was continued a couple of weeks further, while the patient improved in health and strength. In order to ascertain now the effect of stopping the medicine, it was discontinued; but in a few days the fits began to appear again, at first with slight tremors, then transitory moments of unconsciousness, with little or no spasm, but gradually becoming worse and worse until the bromide was again resumed. To make sure that this was not due to circumstances independent of the drug, such as a periodic character of the fits, the recurrence of the monthly illness, or errors of diet, etc., I had the patient kept a long time in hospital under observation, while the drug was administered for periods varying in duration, with the avowed object of baffling any accidental circumstance that might be supposed to influence the fits other than the bromide. The most rigid attempts to deprive the bromide of the credit due to it quite failed, and it was acknowledged on all hands as completely holding the disease in abeyance when regularly taken. The patient herself was so convinced of this, that she begged to be allowed its continuance, when I purposely withheld it as an experiment. Ultimately, I continued it for many months; but between severe attacks of diarrhœa, necessitating now and again its discontinuace, and the fits which would immediately take advantage of its withdrawal, and debility, the poor patient, Grace Edgar, gradually sank. In the case of the other woman referred to, I was never able to stop the fits entirely, but it was distinctly proved that they were much less severe, and instead of lasting a week at a time, they generally ceased in from one to three days.

"For some time back two men, epileptic inmates of the asylum, have been on the bromide. One of them, before beginning the medicine, seldom passed a day without a fit, and often had half-a-dozen in the day. The other had them only about once a week, nearly always in the night-time, having several during the same night. Both men, now, will not rest satisfied without the bromide, and seldom have a fit if the medicine be regularly administered. But on withdrawing it lately, it was evident that the mischief was not removed in either case, so it is again resumed in an increased dose."

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37. *Therapeutic Value of the Sulphites in Zymotic Diseases.*—The researches of Prof. Polli on the antiseptic powers of the sulphites have led many practitioners to believe that in these salts we possess a most valuable remedy for the treatment of the whole class of zymotic diseases. Dr. J. W. Miller remarks (*Ed. Med. Journ.*, Sept. 1869): "These high expectations have not, however, been fully realized in actual practice, and I have thought that it would be not

without profit to communicate the issue of a pretty full trial which, when physician to the hospital here, I gave to the sulphites in the treatment of typhus fever.

"During the year from June, 1865, to June, 1866, there were admitted into the hospital 884 cases of typhus. Of these, 161 were treated by the sulphites; sulphite of soda in most of the cases, and latterly sulphite of magnesia. The quantity administered varied from 60 to 240 grains a day—the most usual quantity for adults being from 120 to 180 grains a day."

Dr. M. gives tables, showing the age, sex, &c., of the patients treated with and without sulphites; from which it appears that the mortality in the former was 1 in 10, and of the latter 1 in 10.3.

"The sulphite seems, therefore," he observes, "to have produced no effect whatever upon the issue of the cases either favourable or the reverse. Neither, during the progress of those cases which recovered under its employment, was there any amelioration perceptible in the concomitant symptoms and complications; nor, in those cases in which the range of temperature was regularly noted by means of the thermometer, was any effect observable, either as regards the degree of elevation of temperature, or the period of the case at which the defervescence was complete.

"Lest it may be surmised that in the sixteen fatal cases the employment of the remedy was not commenced sufficiently early, I may state that in eight of them its administration was begun on or before the sixth day (in 1 so early as the third day; in 2 on the fourth day; in 1 on the fifth day; and in 4 on the sixth day).

"In addition to these hospital cases, I have tried the sulphite in several cases in private practice, with the same absence of effect. Two of these cases ended fatally, in one of which the sulphite of magnesia was given in half-drachm doses every four hours so early as the third day; in the other, it was not commenced till the sixth day.

"In a considerable number of cases, especially among the females, the sulphite induced diarrhœa. This inconvenience would be easily obviated, however, were its administration of importance, by combining with each dose a few grains of compound ipecacuanha powder. Sometimes also, but not so frequently, the sulphite provoked vomiting.

"If the sulphites possess any curative power whatever when administered after the full development of typhus fever, some manifest difference should have been observable in the course and result of the 161 cases in which they were employed, as compared with the remaining 723; and although the number of cases treated by the sulphites is not very large, I think that the facts elicited are abundantly sufficient to prove the uselessness of annoying such patients with the disagreeable draught, for the taste is sufficiently nauseous."

"There remains, however," Dr. Miller observes, "a class of diseases in which, I believe, they have been proved to possess great value—I mean, cases of purulent infection, or septicæmia. In midwifery practice, for instance, such cases are common enough. We have cases of abortion, in which the ovum is imperfectly expelled, and in which portions of the placenta are left adherent to the uterus, which shortly become putrid. In such cases the most serious consequences frequently ensue from the absorption into the blood of the putrescent material. In cases of adherent placenta, likewise, at the full term, the same peril is present. Under such circumstances we possess, I believe, in the sulphites a very effectual means of reducing the danger to a minimum. I have had several such opportunities in practice of testing the power of the sulphites, and with the most satisfactory results. One very marked case occurred to me within the last few weeks. After a very protracted and difficult case of labour, in which the child was hydrocephalic, the head requiring to be opened before delivery was effected, the placenta was found to be adherent. It required to be scraped from the uterus over its whole extent by the fingers, and doubtless numerous small fragments were unavoidably left here and there adherent, as was partly proved by the occurrence, a few days later, of considerable hemorrhage, which was arrested by means of ergot. The woman lost much blood before the extraction of the placenta, was much exhausted by the long labour,

and the uterus contracted very imperfectly. The discharges soon became putrid, and the patient was just in the condition to favour the absorption of the putrescent fluids by the uterine vessels. I put her at once under treatment by half-drachm doses of the sulphite of magnesia every fourth hour. For a few days she was in a high fever, but nevertheless she made a rapid and complete recovery, and was able to walk out of doors within three weeks after her delivery. Several other similar cases have occured to me, to give the details of which, however, would be of little use. They were either cases of delivery at the full time, in which, from retention in the uterus of coagula of blood, or of fragments of the placenta, the lochia became putrid; or cases of abortion, in which the placenta came away piecemeal, and in which, under the employment of the sulphite of magnesia, the constitutional symptoms were either slight or entirely absent. To be of any avail, I believe the remedy must be given in considerable doses, from half a drachm to a drachm every fourth or sixth hour, and, still more, that its use must be commenced early in the case, either before or immediately on the appearance of the constitutional symptoms. In one case of abortion in which the sulphite was not given until after the development of symptoms of blood-poisoning, it had not the slightest effect in mitigating the course of the disease, and the case ended fatally."

38. *Treatment of Hyperidrosis by Sage.*—Van Swieten used sage with good success in the treatment of hypercrinia sudorale; Dr. Vignard profited by this plan in the following case: A man 25 years of age, strong and healthy, was for many years from time to time the subject of abundant sweating, which came on at two or three o'clock in the morning, without any appreciable cause. The secretion was so abundant that the mattress on which he lay was soaked completely, and it was general over the whole body. Sulphate of quinia not having proved of any service, Vignard prescribed the following decoction: Leaves of sage a handful, water half pint. These are made to boil for about two minutes; they are then left to get cool together; the fluid is strained and sweetened to taste. It is taken in the evening. The sweating ceased from the first day of the use of the decoction, but reappeared with the suspension of the treatment. From this good result Vignard advises the use of sage for the treatment of the sweating in phthisical patients, which to the present time there has been found no method of checking. On account of the fugitive character of the effects, it is necessary to keep the patient under the influence of the remedy as long as we desire to prevent the return of the disease. The efficacy of the decoction of sage is increased by the addition of alum and of diluted sulphuric acid.—*Ed. Med. Journ.*, Nov. 1869.

SPECIAL PATHOLOGY AND THERAPEUTICS, AND OPERATIVE SURGERY.

39. *Fusiform and Tubular Aneurism of the Subclavian Artery, and the Treatment by Compression.*—Mr. Alfred Poland read a paper on this subject before the Royal Med. and Chirurg. Soc. (June 8, 1869), the main object of which was to offer some remarks upon subclavian aneurism and wounds and lesions of the subclavian artery, as suggested by an interesting case coming under the author's notice and care at Guy's Hospital. The patient was a man, aged 44, a bricklayer's labourer, who was admitted into Guy's Hospital on October 7, 1868. He had formerly been employed in the gas works, and latterly had been in the habit of carrying a hod of bricks upon his shoulder. For the last two years he had suffered from occasional pain in the right arm, which gradually increased. He attributed this to an injury to the fingers which he had received about that time. During the last month the pain had become so severe that he was forced to give up work. On applying for advice to Dr. David Johnson, of the Old Kent-road, there was discovered for the first time a pul-

sating tumour above the right clavicle. It was considered to be aneurismal, and the patient was recommended to apply for admission into the hospital. The patient, on admission, appeared to be fairly nourished, although naturally thin, and his general health was good. His expression was somewhat anxious. In the supra-clavicular region on the right side there was a pulsating tumour, fusiform in shape, passing downwards and outwards, and meeting the clavicle at an angle of forty-five degrees. It was more than one inch in length, and nearly half an inch in breadth at its widest part, and was very much like a large filbert. Above it diminished gradually to the size of a large goose-quill, and after remaining for a quarter of an inch of that size it seemed to curve downwards and inwards, becoming lost under the muscles. The lower or distal end did not seem to diminish so rapidly, and the pulsations of the artery could be felt between the tumour and the clavicle, as also very distinctly below that bone. The tumour was almost subcutaneous, and the pulsations in it very strong; and the expansion, which was uniform, was considerable during each beat. By pressure on the artery above the tumour, the pulsation in the latter was readily stopped, and the swelling became quite soft and flaccid, and easily emptied, so that it almost entirely disappeared. No pulsation could be felt in the radial or ulnar arteries, nor in any artery of the right arm as far up as the axillary to within a short distance below the clavicle. There was no other tumour or swelling in any part of the course of the vessels, and the axilla was quite free from any induration or glandular enlargement. The right arm was weak, but he could perform easy motion with it. The circumference of the limb, both over the biceps and in the forearm, was less than that of the opposite side. There was also evidence of deficient nutrition in the nails of the fingers of the right hand, which were ill-developed and desquamating. He complained of pain down the radial border of the forearm and in the index finger, and occasionally this pain extended upwards to the acromial process. There was numbness in the fingers and hand generally, but there did not seem to be any impairment of actual sensation. The arm was always cold, and had to be wrapped up in flannels. There was no œdema, and no obstruction in the venous system. It was found that, in consequence of the high position of the first rib in the neck and the comparatively superficial abnormal course of the artery, pressure on the vessel could be made without trouble and without causing pain. Consequently it was agreed to make digital pressure on the cardiac side of the tumour, in the hope of effecting a cure. This was accordingly carried out almost uninterruptedly for ninety-six hours, and then discontinued, in consequence of the discoloration and tenderness of the skin at the site of pressure, and unwillingness on the part of the patient to undergo any further treatment. The tumour, however, had become undoubtedly much smaller and harder, but still pulsated, although this pulsation could be controlled by the merest pressure. The man left the Hospital, and in the course of a month showed himself again, when the tumour had lost all sensation, had become hard and somewhat smaller. This patient attended at Dr. Johnson's residence regularly for several months, and was carefully watched by him. The tumour gradually disappeared, and the whole track of the artery seemed converted into a fibrous cord; but there could be traced a very large artery running transversely across the posterior triangle of the neck immediately above the site of the former tumour. It seemed to emerge from under the sterno-mastoid muscle, and was lost under the trapezius. The author drew attention to the following conditions, and these were illustrated by references to cases and quotations from well-known writers on aneurism: 1. The remarkable deviation from the normal course of the right subclavian artery in the third part of its course. 2. The peculiar character of the aneurism, as being of the fusiform or tubular variety of aneurism by dilatation, and where all the coats are uniformly distended. 3. The treatment adapted—viz., indirect digital compression on the cardiac side of the aneurism, leading to a successful issue. The paper is accompanied with the details of three unpublished cases of subclavian aneurism. 1. A case of subclavian aneurism cured by direct pressure, by Mr. F. M. Corner, Surgeon to the Poplar Hospital. 2. Notes of a case of subclavian aneurism for which amputation at the shoulder-joint was performed with suc-

cess, by Professor Spence, of Edinburgh. 3. A case of aneurism by dilatation of the subclavian artery, by Dr. Robert Adams, of Dublin, with some further notes on Mr. O'Reilly's case of ligature of the subclavian artery for subclavian aneurism. The paper concludes with an elaborate statistical analysis of 115 cases of subclavian aneurism, of which the following table gives a general summary of the cases. These are arranged according to the treatment pursued. The cases are placed under one heading only—viz., under the treatment last adopted, although many of them had previously been subjected to one of the other forms.

Summary of Cases according to Treatment.

	Successful.	Died.	Total.
Cases in which no particular treatment was adopted, and specimens undescribed, and not having been the subject of any operation	3 cases 4 unknown	24 deaths 5 specimens	36
Medical and Valsalva treatment	7	4	11
Hypodermic injection	1 relieved	...	1
Compression	4	...	4
Injection into sac	1	2	3
Acupressure	...	1	1
Manipulation	2	2	4
Galvano-puncture	1	...	1
Attempt at operation	1	6	7
Ligature of third portion of subclavian	6	10	16
Ligature of first portion	...	9	9
Ligature of carotid	...	1	1
Ligature of innominate	...	12	12
Ligature of innominate, and carotid, and vertebral	1	...	1
Ligature of first portion of subclavian and carotid	...	2	2
Ligature of subclavian, carotid, and vertebral	...	1	1
Distal or Brasdor's operation, ligature of axillary	...	4	4
Amputation at shoulder-joint	1	...	1
Total	33	—	—

Med. Times and Gaz., August 28th, 1869.

40. *Temporal Deligation of the Abdominal Aorta.*—Dr. William Stokes performed this operation in a man æt. 50, who had a large pulsating tumour occupying the right ilio-femoral region. Pressure was attended with very severe pain; and the idea of using it was abandoned. The chief difficulty in the operation attended the separation of the peritoneum from the transversalis fascia. The aorta having been exposed, Mr. Stokes "passed a Lüer's aneurism needle around the aorta, just above its bifurcation, and attached to the ligature a piece of silver wire, which was then drawn round the vessel. The ends of this were then passed through Mr. Porter's artery-compressor, and traction was made on them until all pulsation and *bruit* had perfectly ceased in the tumour. The ends of the wire were then secured to the ring of the clamp." The wound was now closed. "The operation was almost bloodless." Afterwards, restlessness, pain, and sensation of heat, were the chief symptoms. The operation was concluded at 11.15 A.M. At 2.30 P.M., it is noted: "The temperature in the left lower extremity is very good; that in the right has greatly improved. At 9 P.M., pulsation in the left femoral artery had returned. At 10.30 P.M., the patient became unconscious; and at 12 (midnight), he died—about twelve hours after the operation. On removing the wire-compressor and slitting up the artery, its coats were found not to have received the slightest injury. Mr. Stokes, in summing up, calls attention to the following facts: 1. Occlusion of so large a vessel without injury to its coats; 2. Early re-establishment of collateral circulation; 3. Rapid consolidation of contents of aneurism after the operation; 4. Death due to a shock in a person with fatty heart; 5. The non-liability to gangrene, owing to re-establishment of collateral circulation, and the power of removing the compression at any time. Finally, a table of the previous cases is given. The full details of this case will be found in the *Dublin Quarterly Journal of Med Sci.* for Aug. 1869.

41. *Femoral Aneurism: Ligature of External Iliac Artery: Recovery.*—Dr. R. T. LAND, of Leeds, read before Surgical Section of British Medical Association, a case of aneurism of the right femoral artery in a woman æt. 33, a weaver. "About six or seven weeks before my seeing her, the patient had much heavier pieces of cloth to lift than usual; this was followed by a weak, numb feeling in the right leg, and a difficulty in standing, to such an extent that she was compelled to give up work. At this time, she noticed, in the upper part of the thigh, a lump, which gradually increased in size, and to relieve the pain of which she had recourse to frequent rubbing with the hand. There was now unmistakably distinct aneurism of the femoral artery. The skin covering it was of a bluish-white colour, glazed, and very tense, and presented all the appearance of giving way externally. In conjunction with my father and my friend Mr. Jessop, it was determined to ligature the external iliac artery. This was accordingly done, under chloroform, on November 24th, 1868. Nothing unusual occurred in the course of the operation, until, after carefully dividing the various strata of the abdominal wall, it became a question whether the structure exposed was peritoneum or simply transversalis fascia. The opinion seemed to be, that the lining membrane of the abdomen had yet not been exposed, and that the structure was transversalis fascia. This was therefore slit up to the full extent of the external wound, when it was at once discovered that the peritoneal cavity was opened. The cut edges were held together by Mr. Jessop; and, without anything further untoward taking place, the operation was completed. All went on well until December 4th, when, from the patient having had a restless night or two, and considerable pain in the right hip, on which she was lying, I was induced to examine that part, and found a very large sloughing bed-sore, which had been considerably aggravated by the patient persistently urinating into the bed, and which, unknown to me, had existed before the operation. With the view to get over this second complication, I now had the patient placed on a water-bed, and the sore dressed, in the first instance, with carbolic acid lotion, and afterwards with zinc ointment, until it was completely healed. Means were adapted to keep up and improve the general condition of the patient; and all went on satisfactorily, with the exception of one or two points, to a complete and satisfactory recovery. The ligature came away, with a little assistance, on December 31st, the thirty-eighth day."—*Brit. Med. Journal*, Nov. 27, 1869.

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42. *Mixed Treatment for Popliteal Aneurism.*—M. DESGRANGES (of Lyons) communicated to the Imperial Academy of Surgery (Oct. 6, 1869) a very interesting case of popliteal aneurism treated successfully by the employment of several methods: digital compression, mechanical compression, flexion, and refrigeration. M. D. recommends this mixed treatment, which perfectly succeeded in this case, the subject of which was a physician.—*L'Union Médicale*, Oct. 16, 1869.

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43. *Hypodermic Injections of Ergotine in Aneurisms.*—LANGENBECK reports (*Berl. Klin. Wochensch.*, vi. 12, 1869) two cases of this.

The first was that of a man æt. 45, with a pulsating tumour in the neck, the size of a fist, and the pulsations in which greatly annoyed the patient. On the 6th of January, 1869, Prof. L. made a first subcutaneous injection of 0.03 gr. watery extract of ergot, on a level with the aneurism. After this the pulsations became weaker and the tumour diminished in size. Between the 6th of January and the 17th of February there was injected at regular intervals of about three days two grammes of ergotine in doses, varying from 0.03 to 0.18 grammes (half a grain to three grains). The tumour was notably diminished in size, and the pulsations were less strong.

The second case was that of a man æt. 42, who had had for twenty years a pulsating tumour of the radial artery, of the size of a hazel-nut, three centimetres from the hand. Prof. L. injected 0.15 gr. of ergotine between the skin and the tumour; the next day the aneurism could not be detected. It reappeared momentarily in consequence of a slight effort made by the patient, but it had completely disappeared at the end of eight days.

The editors of the *Archives Générales* (November, 1869), from which journal we condense the above account, justly remark that these results seem to be very extraordinary, and to have been obtained very promptly, but certain aneurisms are so refractory to every species of medication that it is well to notice every measure which has any appearance of success.

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44. *Polypus of the Ventricle of the Larynx; Ablation after Division of the Laryngeal Cartilages; Cure with the Preservation of the Voice.*—Dr. KRISHABER communicated to the Imperial Society of Surgery a case of this. From the report made by MM. Guyon, Trélat, and Saint-Germain, we glean the following particulars:—

The patient had a fibrous polypus in the right ventricle, every attempt to remove which by the natural passages had entirely failed, but which was fortunately extracted by thyroid laryngotomy. The patient was cured, and his voice preserved, the tone of which was lowered, but in all other respects perfect and free. M. Guyon assured himself of this by causing the patient to sing, and by laryngoscopic examination.

The report extols the operation performed in the above case, and indorses the opinion of Dr. Krishaber that for the removal of all polypi implanted in the sinus of Morgagni, and upon the anterior parts of the vocal cords, the operation which should be selected is thyrotomy. Finally, it will be always preferable to incise at first only the thyroid cartilage and not to make a more extended incision, or a simultaneous tracheotomy, except peculiar circumstances should require it.—*L'Union Médicale*, Aug. 21, 1869.

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45. *Amputation of the Right Arm at the Shoulder-Joint; with Excision of the Scapula.*—Mr. VINCENT JACKSON records (*British Medical Journal*, September 18, 1869) the following case of this:—

Samuel C., aged 35, was admitted into the Wolverhampton General Hospital in December, 1864. He was employed on the Great Western Railway as a labourer; and whilst so employed, was knocked down, being struck on the back by the buffer of an engine, the wheel of which passed over and crushed his right arm. As quickly as possible, I believe, he was conveyed to the hospital; but not before a considerable quantity of blood was lost. At half-past six in the evening, shortly after his admission, I saw the patient. He was an unusually well developed and strong man; his face was pale, but not blanched; the countenance expressive of suffering great pain. He was perfectly sensible, and anxious for something to be done to his arm. His habits were intemperate.

On a careful examination, it was ascertained that a compound comminuted fracture of the right arm and forearm existed, and also that the shoulder-blade was broken in more than one place, although the skin covering it was entire, but seemingly much contused. The chest and the other portions of the body were thoroughly examined, but no lesion was detected. A consultation of the surgical staff of the hospital was held; and it was determined to remove the limb at the shoulder-joint, and to deal with the scapula afterwards, as its condition might require. I as quickly as possible amputated the arm at the shoulder-joint; and, the vessels being secured, an examination with the finger induced me immediately to proceed to the removal of the scapula. It was extensively comminuted and the muscles around it torn, bruised, in fact, almost pulpy; yet the skin, as previously mentioned, was entire. An incision was first made from the upper part of the flap behind to a little beyond the posterior border of the shoulder-blade in a transverse direction and on a level with the spine, and another at right angles to it along the whole extent of the same border. The flaps thus marked out were dissected back, the fractured portions carefully raised from below upwards by division of the muscular attachments, the edge of the knife being kept well upon the bones; the upper and the largest fragments, consisting of the spine and supraspinous fossa, was finally detached after the acromial process had been sawn through, a portion of it being left in attachment to the clavicle. Four vessels were ligatured; the precaution being taken to tie each artery immediately it was cut. The wound was dressed, after the edges had been approximated with wire sutures, with water-dressing. The

patient was placed in bed, but he died the next morning, sinking apparently from exhaustion. The *post-mortem* examination revealed no further injuries than those detected during life.

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46. *Amputation at the Ankle; Union by First Intention.*—Dr. JOHN DUNCAN relates (*Ed. Med. Journ.*, Oct. 1869) the following interesting case of this:—

A railway workman, æt. 22, had his foot crushed by the passage of a wagon over it on the 2d of May. "He arrived in Edinburgh at six in the morning, when I was requested by Dr. Inglis to remove the foot. It was Sunday, and I had only silk at hand, so, after amputating by Syme's method, I ligatured five vessels. The edges of the wound were accurately and closely stitched with deep sutures, and a sponge was applied over the flap, with a little pressure to stop oozing. The sponge was removed in a few hours, and for seventeen days thereafter the stump lay untouched and unmoved. During that time there was not a drop of pus. I then removed two ligatures which hung from one side, and their apertures at once healed. Three at the other side resisted firm traction. Next day a little redness surrounded them, and for a week about ten minims of pus daily exuded. This ceased, and in the fifth week after amputation I forcibly removed two of the ligatures, and broke the third in the attempt. Slight redness followed, but disappeared under twelve hours' irrigation.

"In all, not two teaspoonfuls of pus were formed. The patient was out of bed in three weeks, and at the end of five, could put the weight of his body on the stump.

"The attention of surgeons has of late been much directed to the healing of wounds by primary union. Acupressure, for example, and the carbolic acid treatment have for their object the removal of certain impediments to the process. Whether it be better to use needles removable in twenty-four hours, or to leave a form of ligature permanently in the tissues, is yet *sub judice;* but it is of importance that we do not overlook the part which perfect rest plays in producing the successful result. It is difficult to resist the tendency to ascertain how things are going on, to make the position easier for the patient, or, in short, to meddle with other laudable but pernicious motives. Very little is hurtful friction to a wound, very little breaks down recent adhesions. One advantage of acupressure is that you have no ligatures to pull at—of catgut, that you have no needles to remove. The success of the case related was due plainly to non-interference; and I have thought it worthy of notice, because primary union is rare in the ankle-joint amputation, and because it illustrates at once the innocuousness of silk, and the hurtfulness of the necessary traction."

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47. *Excision of the Hip-joint for Hip-disease.*—In a series of elaborate clinical papers in the second volume for 1869 of the *Medical Times and Gaz.*, Mr. THOMAS BRYANT discusses the subject of Hip-disease, and in the No. for October 16, he offers the following remarks on excision of the joint:—

"When dead bone can be made out to exist in a suppurating hip-joint, there can be no question about the propriety—nay, necessity—of its removal, and as it is generally in or about the head or neck of the femur, it seems tolerably certain that the best practice lies in its decapitation. When the bones entering into the formation of the hip-joint in its pelvic aspect are also involved, there seems to be no strong reason against their removal, should they be necrotic; for it is certain, as long as they remain to keep up irritation, a cure by natural processes is impossible. An operation undertaken upon the hip-joint, under these circumstances, is scarcely more than any severe operation for necrosed bone, and, in all probability, is not more dangerous. The joint as a joint has to a certainty disappeared altogether, and a free incision into it will hardly add to the dangers of the case. An operation undertaken under these conditions should be classed with those for dead bone. When the acetabulum is only superficially affected or stripped of its cartilage, there is no reason why the diseased head of the bone should not be removed; for the disease in the pelvic portion of the joint is probably secondary to that in the femur, and will undergo a natural repair as soon as the source of its disease has been removed.

When the disease in the pelvis is extensive, the operation of excision may certainly be an open question—that is, of excision of the head of the femur alone; for if the pelvic bones are necrotic or irreparably diseased, it is quite certain such an operation will be of little use. If the necrosed pelvic bones can, however, be removed (and there is no limit to the capabilities of surgery in this respect), there is no reason why the operation should not be followed by a good result; for operations for necrosis, however extensive, are, as a rule, successful, and when performed upon the disorganized hip-joint, there is no reason why they should not be attended with a like success. Extensive gouging of inflamed or so-called carious bone, whether about joints or otherwise, I always look upon with disfavour. The gouging, I am disposed to think, does as much harm as good when applied to any other than dead bone. The removal of dead bone is always a good practice, but the gouging of inflamed bone I hold to be unnecessary, if not injurious.

When the presence of dead bone cannot be made out, or evidence exists that no such complication seems to interfere with a natural recovery, it is still a disputed point amongst surgeons whether excision of the head and neck of the femur be a necessary or even justifiable operation, for those who argue against its adoption assert, and with some truth, that all these cases of hip disease are capable of a natural repair in patients who have good or even tolerable reparative powers; and that in those that have not, the operation of excision would naturally fail, for as much power is probably needed to effect a cure after excision as is demanded for the natural cure of an uncomplicated suppurating or disorganized joint.

To these latter remarks, however, I am disposed to demur. I am ready to admit—indeed, I sincerely believe—that, in all cases of disorganized hip-joints in which disease of the bone does not exist to interfere with recovery, a natural cure may fairly be looked for at no distant date, as long as the powers of the patient keep up their strength, and no signs of failure make their appearance. But when these signs show themselves in a decided way—when evidence exists that in the battle of disease the reparative processes yield to the morbid, and that treatment fails to turn the scale in their favour, it becomes an open question, which we will appeal to facts to decide, as to the expediency of performing excision, although I may at once admit that I believe the operation, under such circumstances, to be not only justifiable, but highly advisable. The removal of the source of irritation decidedly acts beneficially upon the patient, and many a case has doubtless gone on to recovery after the operation of excision that would, unoperated upon, have eventually succumbed to the disease, worn out by suppuration and exhaustive efforts of repair.

For facts in reference to excision of the hip-joint, I have gone to Hodge's work, and to a recent paper by Dr. R. R. Good, of Paris, the former author giving us a statistical table of cases up to 1861, and the latter from 1861 to 1868. Hodge gives us 111 cases, 56 of which recovered, and 53 died. Good quotes 112 cases, 52 of which recovered, and 60 died; a little more than half of the whole number of cases have thus proved fatal.

Mr. Holmes also, in his excellent work on children's diseases, gives us nineteen cases, of which, in a general way, one-third died from the operation, another third recovered with useful limbs, and the remaining third, although not recovering, derived great benefit from the operation.

On analyzing, however, these cases a little closer, and more particularly inquiring into the influence of age upon the operation, some valuable facts come out; for of 100 cases as given in Hodge's work, in which the age of the patient was reported, and in which amputation was not subsequently performed, I found the following results: Out of 46 cases operated upon under 10 years of age, 15 died, or 33 per cent.; out of 37 cases operated upon between 11 and 20 years of age, 21 died, or 57 per cent.; out of 12 cases operated upon between 21 and 30 years of age, 7 died, or 60 per cent.; out of 6 cases operated upon over 30 years of age, 5 died, or 83 per cent. The analyses of Good's cases indicate the same truths, for of cases operated upon under 12 years of age, 40.6 per cent. died; between 12 and 20 years of age, 60 per cent. died: between 20 and 58 years of age, 76 per cent. died.

In young life, therefore, in which hip-disease is usually met with, excision of the head of the femur is by no means a fatal operation, as two out of three get well; from 10 years to 30 years of age, something less than half recover, and after that period it is full of danger. Excision of the hip-joint is clearly more dangerous as age increases, and in this it is like amputation, lithotomy, or any other great operation. Children beyond infancy bear these severe measures well, and it is important that this fact should ever be before us.

It is, however, of equal importance to remember that it is in young life we meet with the best success in the treatment of disease—in hip-joint as well as in other joint affections.

Recognizing the fact, therefore, that excision of the head of the femur is not only a justifiable, but a good operation in selected cases, let us briefly consider under what circumstances it should be performed.

From the general facts as learned from statistics, two great results clearly come out:—

That in childhood this operation is attended with success, two patients out of three recovering, and

That in adult life it is attended with great danger, two out of three patients at least dying.

In the former case, consequently, the operation may be entertained under circumstances which in the latter would render it clearly unjustifiable.

With these two broad truths before us, let us enter a little into particulars in our endeavour to determine the question, When should excision of the hip be performed? And, first of all, when should it not be performed?

It should certainly never be performed in cases in which suppuration or disorganization of the joint has not taken place; for as long as this condition is kept off, by surgical as well as medical skill, a sound hope exists that a cure of the disease, although by anchylosis, may be secured. The cases I have already quoted on previous occasions clearly illustrate this fact.

It should not be performed when all evidence tends to show that the bones entering into the formation of the joint are not extensively involved, or necrotic wholly or in part, and the general condition of the patient under proper treatment is fairly maintained.

It should not be entertained for disorganization of the hip-joint as the result of synovial disease, unless it is clear that the general health of the patient is gradually yielding to the disease.

It should never be performed for acute suppurative disease.

On the other hand, it should always be entertained where it is clear that extensive bone mischief exists, or partial necrosis; for it is tolerably certain that, under such circumstances, a cure by natural processes is highly improbable.

It should always be entertained where the general health of the patient is clearly giving way under the influence of the local disease, whether that disease be in the bones or synovial membrane, or both.

I believe these general conclusions respecting excision to be based on a fair interpretation of the clinical and pathological facts which I have been able to gather upon the subject. They can only be given, however, as general guides for practice. The discussion upon the propriety of an operation in any given instance must rest invariably upon the particular facts of the individual case. The accumulated experience respecting excision which has been given to the profession is certainly enough to prove that excision of the hip is a very valuable operation under certain circumstances, and it would be a pity to bring it into disrepute by performing it in cases which are capable of a cure by natural processes."

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48. *Extirpation of the Os Calcis.*—The Nos. of the *Archives Générales de Médecine* for Sept. and Oct. 1869, contain an elaborate memoir, by Prof. POLAILLON, of Paris, on this operation which was first performed by Monteggia, in 1814, but which he thinks is not sufficiently often resorted to in consequence of its value not being known. In order to determine the cases to which it is applicable, and to establish its value on a solid basis, Prof. P. has collected 65

cases of extirpation of the os calcis, which he has collated and arranged, showing the result in each case.

After giving a summary and analysis of these cases, Prof. P. considers the objections which have been urged against the operation, all of which he conceives to have no great weight, and then minutely describes the method of operating which he prefers.

The following are the conclusions at which he has arrived from his investigations:—

Extirpation of the os calcis should be a recognized operation, for it preserves a very useful foot both for standing and walking.

The success of the operation varies according to the age of the patient.

In children and adolescents it succeeds more than eight times in nine, and affords a useful limb.

In adults it fails in half the cases, and when it succeeds does not in general give as good results.

In cases of caries of the os calcis, in children and adolescents, extirpation of that bone should always be preferred to amputation. But in adults amputation is preferable to extirpation; for in them a stump generally affords a more solid and less delicate support for the purposes of a lower limb, than a foot deprived of its os calcis. It must be borne in mind, however, that the mortality after amputation is much greater than that after extirpation, and that under certain conditions the latter may effect a cure with much less peril to life.

When rest and appropriate topical applications fail, after long trial, to cure disease of the posterior portion of the foot, and the propriety of an operation is considered, the surgeon should carefully examine whether the os calcis *alone* is diseased, or whether the neighbouring parts and the tibio-tarsal articulation is implicated. If the localization of the disease is well established, the diseased bone should be extirpated.

But if the limits of the disease cannot be determined either by methodical exploration, or the attendant functional derangements, or the progress and history of the disease, the idea of extirpation should not be abandoned. Everything should be arranged as if for the performance of that operation—an exploratory incision down to the bone should be made, so that this incision may serve, according to the extent of the disease, either for the ablation of the os calcis, or for the tibio-tarsal disarticulation, or for amputation of the leg.

In cases of comminuted fracture of the os calcis by a ball or from other cause, with penetrating wound of the integument, it is probable that extirpation will be necessary, because in general ostitis results in caries. We generally wait before operating, in order to be sure that the wound of the bone will not heal by granulation.

In central caries which has not yet extended to the articular surfaces of the os calcis the operation for *complete scooping out of this bone* should be performed.

In peripheral caries with suppuration of the articulations of the os calcis, the disarticulation of the bone with rasping or cauterizing of the corresponding articular surfaces, should be resorted to. But if the astragalus, the cuboid, and scaphoid are deeply affected with caries, it is prudent to at once perform tibio-tarsal amputation. When the whole bone is necrosed, and where there is diffuse phlegmonous erysipelas, excision of the os calcis succeeds best, because the periosteum is separated by the suppuration, and the operation consists of simply extracting the sequestrum. It is also in these cases that the most complete bony reproduction takes place.

The neoplasms which may indicate extirpation of the os calcis are especially enchondromas or fibromas, almost never cancers. At their commencement cancers do not form a tumour sufficiently appreciable to be diagnosticated; later, when they have become large, they invade the neighbouring tissues, and it would not be prudent to attempt any other operation than amputation of the foot.

The existence of fistulæ, or of small ulcers, or of inflammatory induration of the heel do not contraindicate extirpation. But extensive ulceration of the skin, its alteration from the existence of a cancerous tumour, or even its extensive thinning from the development of a benignant tumour, contraindicate extir-

pation. Even supposing that a cure could be effected, the patient would be obliged to walk on a cicatricial surface, and would be exposed to all the troublesome consequences which result therefrom.

In all cases it is advantageous not to delay operating too long. The constitutional irritation resulting from extirpation of the os calcis is so trifling that the operation may be performed even on patients exhausted by long disease.

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49. *Dislocation of the Shoulder downwards, or in the Subglenoid Position, with Fracture of the Neck of the Humerus, probably Extra Capsular.*—An interesting case of this was communicated to the Medical Society of London by Mr. HAYNES WALTON. The patient was a man, æt. 48, who, ten weeks before seen by Mr. W., had fallen into a drain. Fracture was at once detected and treated. A month afterwards, on removing the splints, the dislocation was recognized. The patient suffered very much pain—in fact that alone sufficed to justify the attempt at replacement. The ordinary method, however, of procedure, was out of the question on account of the recent fracture. The following plan was adopted: The whole of the limb was most carefully padded, from under the head of the humerus to the wrist; a splint a yard in length was then applied along the inner side of the limb, and another of the same dimensions on the outer side, the two being thoroughly fastened together by straps. The patient was then placed on a table, and chloroform administered to him. A broad strap was then placed across the shoulder, and carried down over the belly and the back, and attached to a cord in a line with the body. By this the scapula and clavicle were fixed, and the body was kept still. A second and narrow strap was passed under the arm, and made to rest on the head of the humerus, its extremities being attached to a cord communicating with the pulleys behind the head of the patient. Extension was made in the ordinary manner, the splints being used as a lever to direct the bone in the required position, Mr. Walton at the same time applying the required manipulations. By this plan there was "no pulling made on the bone, so that the fracture remained undisturbed, nor any lateral pressure on it, as the lever acted above it." After three-quarters of an hour, unexpectedly, and with a distinct noise, the reduction of the dislocation was effected. A good deal of local and general disturbance followed, but at the end of three weeks, passive motion was commenced, and at the end of six weeks the arm could be used nearly as well as the other. Mr. Walton explained that during the operation no doubt numerous adhesions were broken down.—*Lancet*, Oct. 30th, 1868.

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50. *Results of Paracentesis Thoracis and Tracheotomy.*—In a report made to the Medical Society of Hospitals on the diseases most prevalent in Paris during the two months of March and April, M. BESNIER has taken notice of the frequency and severity of pleurisies, and the advantage gained by the operation of paracentesis. In twenty-five cases, the operation had been performed fourteen times always with success, the patients treated in this manner having recovered more rapidly than those did in whose cases the effusions were too limited to warrant the operation. It is not only in subacute cases where the effusion is considerable that those physicians accustomed to the operation make use of it, but M. Frémy, for example, has used it in four cases of acute pleurisy with comparatively slight effusion, and in all the four has been thankful that he did so.

The success of surgery has been less when applied to the treatment of croup. We are neither for nor against tracheotomy. We believe that in desperate cases it may be of service in prolonging life, and thus either giving our art the chance of interfering with success, and the organism the opportunity of regaining sufficient strength to combat disease successfully; but we dare not advise its performance in croup in the way in which we advise paracentesis in pleurisy. The partisans of tracheotomy answer the fatal statistics of its opponents by saying, that it is used only in cases of the worst kind, in which the disease, if left to the resources of the physician, would prove certainly fatal; and that, consequently, successful cases are really *resurrections*. We do not wish to oppose this way of looking at the subject; but we must say, that during March

and April, there have been very few of these resurrections. M. Barthez, a great supporter of tracheotomy, has had thirteen cases in the two months, eleven of which have died. M. Bergeron, out of nine cases, has had three successful ones. M. Roger has lost all the seven cases in which he has operated; one of them, however, died from the effects of fever contracted in the hospital. —*Ed. Med. Journ.*, Nov. 1869, from *Gazette Médicale de Paris*, No. 23, 1869.

51. *Section of Nerves in Tetanus.*—On the evening of November 25th. instead of amputating, Dr. MAUNDER cut down upon and severed the ulnar, radial, and median nerves of the arm of a man who was the subject of tetanus following injury to the three inner figures. On the next day, the symptoms were aggravated, and the disease appeared to be pursuing its usual course. The patient afterwards died.—*Brit. Med. Journal*, Dec. 4, 1869.

52. *Ovariotomy twice successfully performed on the same Woman.*—Dr. W. BOINET communicated to the Imperial Academy of Medicine, Sept. 28, 1869, the case of a woman æt. 48 with an ovarian tumour, upon whom he performed ovariotomy on the 11th of Oct. 1868, removing the left ovary, which weighed about 18 kilogrammes (nearly 37 pounds); recovery was rapid. Ten months afterwards he operated again, removing the right ovary, which weighed 9 kilogrammes (nearly 18½ pounds); the patient recovered. The right ovary had been carefully examined at the time of the first operation, and was not observed to be enlarged, so that it had attained its present size in a very short period.—*L'Union Médicale*, Sept. 30 and Oct. 2, 1869.

53. *Ovarium and Fallopian Tube included in a Crural Hernia.*—Dr. OETTINGEN (*Petersburg Med. Zeitschr.*) describes the case of a female, 32 years of age, who, fourteen days after her ninth confinement, upon lifting a heavy weight, found that a swelling about the size of a walnut had made its appearance in her left groin which was irreducible, but produced no inconvenience. At the end of nine years, for the first time, rending pains in the swelling were experienced; the latter became more tense; vomiting ensued, but the discharges by stool were not interfered with. When seen by Dr. O. the swelling was of the size of a goose's egg. At the end of ten days after strangulation had taken place, an operation was performed. The swelling was found to be caused by a crural hernia. On opening the sac it was found to contain an ovarium of a dark red colour, near to which lay an intensely red coloured fold of mucous membrane, similar in appearance to the coronal of a small flower, and was unquestionably the swollen fimbriæ of the mouth of the Fallopian tube. The operation of detaching and the reposition of the displaced parts was somewhat troublesome. The healing followed quickly by the first intention.—*Centralblatt. f. d. Medicin. Wissenchaft.*, Aug. 1869. No. 39. D. F. C.

54. *Stricture of the Urethra; its Prevention, Early Detection, and best Method of Treatment.*—Mr. W. F. TEEVAN, in a paper read before the Surgical Section of the British Medical Association at its meeting in July last, drew attention to the importance of detecting stricture of the urethra in its earliest stage. The ideas as to the sign denoting the presence of stricture were vague. Mr. Teevan defined stricture to be "any diminution of the normal calibre of the urethra, the result of the contraction of organized lymph." The presence of a gleet of six months' duration or more, might commonly be regarded as the outward and visible sign of the existence of a stricture which might, perhaps, in no way interfere with the flow of urine; and the actual presence of such stricture might be demonstrated by the *bougie à boule*. That instrument was invented by Sir C. Bell, and was by him made in metal. Leroy d'Etoilles improved its usefulness by making it of an elastic material, which allowed the instrument to follow the deviations of a tortuous and deformed urethra; its diagnostic value was still further enhanced by Dr. Henry Dick, who had the shoulder of the bougie made sharp and angular. The *bougie à boule* was simply for diagnosis. It would, as it was being withdrawn, catch at the slightest unevenness in the urethra, and told accurately the slightest change in the mucous membrane.

That tissue, in its normal condition, transmitted through the bougie the sensation of travelling along a velvety path; and, if there were any constriction, not only would that fact be communicated to the surgeon, but also the degree of pathological change which the urethra had undergone. The *bougie à boule*, therefore, would detect stricture of the urethra in its earliest stage; and the treatment of such stage might correctly be termed the preventive treatment. When a patient went to a surgeon for a gleet, he ought always to be examined with the *bougie à boule*, for it was necessary to ascertain the pathological condition of the canal before an appropriate treatment could be decided on. If there were no constriction, deep injection was proper; but if there were contraction, however slight, it would be aggravated by injection, but cured by gradual dilatation. Mr. Teevan, after enunciating M. Mercier's views of the pathology of stricture, discussed the seats of stricture, as deduced from facts observed by himself. He grouped together stricture at the bulb or membranous urethra, and called it "subpubic." This was by far the most common kind of stricture, simply because the triangular ligament favoured its production. The next stricture in order of frequency was the "penile," situated at a spot varying from two-and-a-half to three-and-a-half inches from the meatus externus. This stricture was rarely absent, in some degree, when the other was present. The rarest form of stricture was that just within the meatus, the "orificial." Strictures, regarded in their physical conformation, were of two kinds—the "tunnel" stricture and the "ring" stricture. He called them so on account of the sensations communicated to the *bougie à boule* when passing through them. Subpubic strictures were generally of the tunnel kind; orificial strictures were of the ring character; and penile strictures partook of both forms. The measurements given of the length of the urethra varied from seven to eight or nine inches. He had found the average length to be seven and one-eighth inches, as deduced by himself, from measuring the urethra of one hundred males. Regarding the treatment of stricture, he stated that, after witnessing the practice of various surgeons, and trying different methods, he had come to the conclusion that there was no treatment equal to that of gradual dilatation by means of the *bouge olivaire* and the piliform bougie, which treatment, he believed, he was the first to introduce into English hospital practice. Forcible dilatation was only applicable to the easier kinds of strictures; it was not devoid of danger; it caused an unknown lesion; it had to be always followed, and often preceded, by gradual dilatation, so that it could only be regarded as an occasional auxiliary in the treatment of stricture. Gradual dilatation was the safest treatment for the patient, for, out of one thousand recorded cases, there had not been one death; all the sufferers could be treated as out-patients, and no man need ever lose an hour's work during the treatment. The *bougie olivaire* glided in so easily that the patient was scarcely aware of its presence. It was necessary to pass an instrument about once in every three or four months, even after an apparent cure. Dilatation ought to be conducted up to the highest size that the urethra would take.—*Brit. Med. Journ.*, Nov. 6, 1869.

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55. *Holt's Dilator for Stricture.*—Mr. D. M'GREGOR, late Superintendent of Barnhill Hospital and Asylum, says (*Ed. Med. Journ.*, Oct. 1869): "Although this instrument has been several years in use, I do not think advantage has been taken so extensively as might be of its decided usefulness. Only in four cases have I had occasion to use it, and in all the four with the most perfect success. Indeed the cure was so remarkable that I think (if I may be allowed to judge from so limited a number) in all suitable cases for this instrument it is a needless loss of time, in hospital practice at least, to spend weeks upon the gradual dilatation of stricture when it can be safely done in most cases in fewer days. In my four cases I had a difficulty in passing a No. 2 catheter at first into the bladder, after which Holt's instrument was passed, and the stricture ruptured or forcibly dilated, so as allow a No. 10 gum elastic to pass with ease. In none of the cases did a bad symptom follow, except a slight shivering in one; and, save passing the No. 10 once a day for two days, there was no further interference necessary. The urine was passed in all of them in a large and easy stream, and they were at once dismissed well. I noticed, in his recent excel-

lent lectures on the surgical diseases of the urinary organs (published in the *Lancet*), that Sir Henry Thompson, though he speaks favourably of Holt's dilator, prefers cutting stricture by means of a bladed instrument introduced into the urethra. I consider this, however, a much more difficult and dangerous proceeding than the other, while I scarcely think it more successful."

56. *Dr. Dolbeau's Use of Alcohol in Dressing Surgical Wounds.*—The following is Dr. D.'s (the eminent surgeon of Hôpital Beaujon) plan of proceeding. Having performed the amputation, or removed the tumour, as the case may be, he stanches the hemorrhage, by such means as are appropriate and usual in the circumstances. He then washes the wound with what he calls *pure* alcohol; or, in other words, with the strongest commercial alcohol, unmixed with water. The next proceeding is to dry the bleeding surface with fine soft linen. The dressing is now applied. This consists in filling up the cavity caused by the loss of substance, or covering the flaps of the amputation with feathery tufts of fine charpie soaked in pure alcohol. The part is then farther covered with compresses, which likewise are soaked in pure alcohol. The dressings are then inclosed in a double envelope of the impermeable gutta percha tissue, which has of late years superseded oiled silk for most medical and surgical purposes, and which is superior in respect of elasticity and cheapness. The whole of the dressings and coverings now described are retained in position by a few rounds of a bandage.

The dressings now described—applied, be it observed, when all bleeding has ceased—remain undisturbed till the following day, when they are entirely renewed. During the course of the day, it is useful to open up the impermeable covering, and, without touching the underneath dressing, moisten it with pure alcohol. At each dressing, it will be found that the charpie is adherent to the raw surface: to detach it without causing an oozing of blood, the dressings ought to be moistened by means of syringing it with alcohol.

When the proceedings as above described are carried out with exactitude, there is no bleeding from the wound, and the parts are kept in a favourable state of moisture. At the end of a period, varying from five to ten days, the raw surface is quite dry, and presents a slate-gray appearance. The surface may be kept in this dried-up state—in this condition of local embalmment—as long as is desired. Cicatrization proceeds very, very slowly; and to accomplish permanent healing, it is necessary to induce suppuration in the wound.

Dr. Dolbeau holds that his method of alcoholic dressing prevents the occurrence of traumatic inflammation; and I am assured by friends who have had considerable opportunities of observing his hospital practice, that this opinion is well founded. He says—and this I have personally observed—that the patients have generally little or no fever, and that their strength is inversely proportionate to the suffering they have had or the quantity of blood they have lost in the operation. By keeping the wounds in the state of alcoholic dryness (*sécheresse alcoolique*), as Dr. Dolbeau calls it, traumatic reaction is prevented; and by that means, any necessary length of time is obtained for the patient to get up his strength.

When all goes well—when the appetite and sleep are natural—when strength is regained, the alcoholic treatment is discontinued, and glycerine is used. The time has now come, according to Dr. Dolbeau, when, without detriment, the patient can support suppuration. The surgeon, however, after instituting suppuration by dressing with glycerine, may, if he think it necessary, arrest or diminish the formation of pus by using pure alcohol, or a mixture of alcohol and water.

At first, the alcoholic treatment occasions a good deal of pain; but, by the end of the second or third day, the wound has become insensible. Some patients beg urgently that the alcohol may be used somewhat diluted with water, but Dr. Dolbeau says that this demand ought to be resisted.

The direct application of pure alcohol often vesicates the skin surrounding the wound. When this inconvenience occurs, it is easily remedied by powdering the blistered surface with starch or rice. In a few exceptional cases, the lips of the wound become greatly swollen, while the surface of the wound has

the usual alcoholic dryness and the usual slate-gray colour. In such cases, Dr. Dolbeau discontinues using the alcohol, and has recourse to starch poultices. Once the swelling has disappeared—an event which occurs simultaneously with the establishment of copious suppuration—Dr. Dolbeau resumes the use of the glycerine dressing, and syringes the wound every morning with pure alcohol, so as to cause the separation of all the portions of tissue destroyed by the suppuration.—*British Med. Journ.*, Nov. 20, 1869.

57. *Diseased Elongation of the Bones of the Extremities in Relation to Surgical Practice.*—Prof. LANGENBECK, in a recent paper read to the Berlin Medical Society, draws attention to a consequence of disease of bone first noticed by Stanley, and further demonstrated by Paget. He observes, that until the twenty-third or twenty-fifth year, the bones may, under the influence of general disturbances of nutrition or local disease, undergo greater variation in form and size than the soft parts. In the rickety subject defective length is a more characteristic sign than either the curvature or the chemical condition of the bones. The influence of paralysis in checking the growth of bone requires more investigation, for while in some cases this is found to be imperceptible, in others it is very considerable. Affections of the epiphyses and of the joints will naturally give rise to considerable shortening, and all the bones of the same extremity may participate in this on account of the forced inactivity. The same effect is also observed when the joint itself is not diseased, but kept in a state of forced contraction; but here probably the result is a mechanical one produced by the altered mode in which the deposit of new bone is made. How small a power need be exerted to produce this effect is seen in the fact, that when fingers are united together, but are yet able to perform all their principal functions, their bones, if the web be not properly divided, will remain shortened. In a still greater degree the same effect is exerted by cicatrices from burns in the neighbourhood of joints.

It is, however, to abnormal elongation of the bones that attention is chiefly directed in this paper. This may easily take place to the extent of one or two centimetres, or more, without detection, unless careful admeasurements be made. A long bone, as a general rule, grows longer and thicker in proportion as it has been in an inflamed or hyperæmic condition, and a hyperæmic condition of the soft parts is also competent to produce this change. Thus, in a case of inguinal aneurism, Broca found that the femur had increased two, and the tibia one centimetre in length. Ulcers of the leg occurring early in life produce the same effect; and although chronic inflammation and caries of joints exceptionally arrest the growth of bone, in other cases they lead to its elongation. The great majority of cases of increased growth, however, arise from chronic disease of the diaphysis of the bone, *i. e.*, osteo-myelitis or necrosis.

A very interesting case is given in which careful admeasurements were made at the autopsy, and all the bones on the diseased side were found considerably longer. A remarkable appearance noted was the diminution of the circumference of the upper articular surface of the tibia by one, and of the lower surface by half a centimetre. This may be attributed to the fact of the greater longitudinal development of the diaphysis having taken place at the expense of the epiphysis. In the arrested growth of the rickety bone, on the contrary, the circumference of the articular surface is increased. The fibula, in the above case, although not diseased, had increased by two centimetres in length like the tibia. Another important point was, that the femur of the same side also underwent considerable elongation, for while the tibia was found to have increased by two centimetres, the whole limb, measured carefully during life, was found to be five centimetres longer than the other. Similar observations are reported by Paget and Bergmann; and Langenbeck has met with the same circumstances in the upper extremities.

Bearing the above facts in mind, it occurred to Prof. Langenbeck whether they might not have their surgical application in the treatment of shortening of the bones of the extremities. As necrosis occurring in young subjects is the most frequent cause of abnormal elongation of bone, and is probably due to the abiding stimulus of the sequestrum, it might be expected that the insertion

of a foreign body in the bone would be attended by a similar result. He therefore instituted some experiments on young dogs, employing Dieffenbach's ivory pegs as having a near resemblance to bony structure. These were followed by most favourable results, the effects being in fact just the same as those observed in necrosis, viz., an elongation and thickening of the shaft, and a lessening of the epiphysis. Moreover, the bone remained undistinguishable in any other respect from normal bone, being neither inflamed nor in any way diseased. So the matter stands at present, for although Professor Langenbeck believes that surgical interference will be advantageously employed in this direction, he has not yet resorted to it. He observes, that while a few centimetres shortening is of little consequence as regards the upper extremity, it is of serious import in the lower, and any reasonable means of removing it or diminishing it should be employed. Excision of the joints in children will acquire an additional importance also, if we are enabled by the introduction of one or two of the pegs immediately after the operation to prevent the arrest of growth in the limb. Subjects suffering from paralysis are favourable for the trial of the means, as they will with less difficulty sacrifice the five or six months necessary to be passed in quietude to secure the success of the experiment. One of the most important results of the trials made on dogs is the demonstration of the efficacy of extension in elongating bone. The fibula, to which nothing has been done, was found to have increased two centimetres as well as the tibia, and yet to have undergone no displacement. This was effected by the stretching effect exerted upon it by the tibia, to which it had become united in one bony mass. Of the possibility, by suitable extension of increasing the length of shortened bones, there can be no doubt, although the determination of the amount of this by admeasurement is very difficult.—*Berlin Klinische Wochenschrift*, June 28.

[In relation to the above subject a very interesting paper by Drs. Weinlechner and Schott, which we have not space to notice, will be found in the *Jahrbuch für Kinderheilkunde*, 1869, heft 3, entitled, "On Elongation and Shortening of Bones after Fractures, Caries and Necrosis and Inflammatiou of the Joints."] —*Brit. and For. Med.-Chir. Rev.*, October, 1869.

58. *Bending of the Radius in an Adult.*—Dr. R. Farquharson records (*British Med. Journal*, Dec. 4, 1869) the following case of this rare occurrence :—

"On the 15th of last October, I was watching a football match on Rugby School Close, when J. S., aged 18, asked me to look at his right arm, which had been injured during the game. On cursory inspection, I could detect nothing far wrong; and, considering his symptoms due to a severe bruise, merely recommended rest and fomentation. Next day, he again presented himself, stating his conviction that he had bent his forearm by the accident. Naturally rather incredulous, I made a careful examination, and found that he was quite right, and that a well-marked distortion really existed. Both bones were affected in some degree; but the chief strain had been experienced by the radius, which described a considerable curve, with the convexity inwards. No feeling of crepitus could be detected, nor any trace of irregularity along the margin of the bone; and motion, although attended by slight pain, was altogether unaffected. The deformity readily yielded to firm manipulation over the knee; but, as it speedily returned on the withdrawal of the force, it was necessary to apply an anterior and posterior splint.

"On October 20th, the splints were removed; but the bend of the radius, though decidedly less marked, could still be observed. Reduction, if I may so call it, being effected as before, the splints were readjusted. On October 26th, on uncovering the arm this morning, it was found to have entirely regained its normal shape; a slight degree of weakness and stiffness only remaining. Since that date, it has rapidly recovered strength, and has never given rise to uneasy sensations of any kind."

What is remarkable in this case is that no predisposing cause could exist; for the patient "was not only stout and well developed, but of special activity in those games which most severely test the frame. We must, therefore, look upon the case as one of an exceptional nature, in which rending of a perfectly sound bone took place, irrespective of fracture; and the record of such an event

may save others from the error, into which I so nearly fell, of overlooking the true nature of the injury; for, although the consequences of such an omission might not be very serious, the resulting deformity, however slight, would sooner or later have proved an annoyance, and brought discredit on the medical art. It is, therefore, fortunate that the marked way in which my attention was drawn by the lad to the nature of his lesion prevented my being led astray by the recollection of our ordinary surgical principles."

59. *Foreign Body in the Rectum.*—POLLACK (KAPOSVAR), in the *Wien. Med. Presse*, 1869, No. 8, relates the case of a mendicant, 50 years old, who, in consequence of a foolish bet, allowed a champagne flask to be thrust through the anus into the rectum, where it was allowed to remain for twenty-six days; the patient, in the meantime, lying without proper care, in a stall partly filled with straw, and suffering from the most excruciating pains in the abdomen. The bottom part of the flask could be felt just within the anus, and its mouth could be traced, through the abdominal parietes on the left side, and about the breadth of two fingers below the xyphoid process. Dr. P. and several of his colleagues failing, after repeated efforts, to extract the flask by means of the fingers alone, it was suggested that a steel rod, with a lozenge-shaped point, be carried up along side the flask, within the anus, and a hole bored through the curve formed between the sides and neck of the flask; through which hole a strong hook attached to a suitable handle was passed. By cautious traction with the latter the flask was slowly removed. It measured in length $12\frac{1}{2}''$, in diameter, at its neck, $1''\ 2'''$, at its middle $2\frac{3}{4}''$, and at its bottom $2\frac{1}{2}''$. After the extraction of the flask the patient soon regained his ordinary health.—*Centralblatt f. d. Med. Wissenschaft.*, May, 1869, No. 25. D. F. C.

OPHTHALMOLOGY.

60. *Transitory Blindness in Acute Diseases.*—Dr. TOLMATSCHEW (*Jahrb. f. Kinderheilk.*, New Series, II.), to the few cases previously on record of the occurrence of transitory blindness in acute affections, adds the account of another observed by him. In a patient 12 years old, labouring under an attack of ileo-typhus, towards the end of the 4th week, with the return of perfect consciousness, it was observed that the patient had become so blind as to be unable to distinguish objects, possessing simply a slight ability to distinguish between light and darkness. The blindness continued for some seven days, after which normal vision was gradually regained, but considerable time elapsed before the previous acuteness of vision returned. No mention is made of any special treatment having been entered upon in consequence of the blindness. No ophthalmoscopic examination of the eye appears to have been made.—*Centralblatt f. d. Med. Wissenschaften.* 1869, No. 24. D. F. C.

61. *Cases of Syphilitic Affection of the Third Nerve producing Mydriasis with and without Ptosis.*—The cases communicated by Mr. VICTOR DE MÉRIC to the surgical section of the British Medical Association at its meeting in July last, were all clearly traceable to the syphilitic taint; they were five in number, and Mr. de Méric related a sixth, where a syphilitic taint could not be made out, but where mercury acted very advantageously. From a survey of these cases, it became evident that the prognosis is generally favourable, the malady being amenable to treatment, which, in these instances, had consisted in the administration of mercury or iodide of potassium—according to the stage of the disease—the use of the Calabar bean, and the electric current. Medical literature had, from time to time been enriched with cases of this kind; and these, coupled with Mr. de Méric's cases—the details of which had been carefully noted, and the diagnosis accurately laid down—proved that syphilis, besides occasionally causing disturbance in other portions of the nervous

system, may directly influence the functions of the motor oculi nerve. The author directed attention to the rarity of these cases, as he had collected but five during a special and private practice of 23 years. He was inclined to think that, in syphilitic affection of the third nerve, the sheath of the trunk or filaments principally suffered; as tumours, clots, and abscesses, would not so easily have yielded to treatment. In the instance where mydriasis had existed without ptosis, he suspected, with some ophthalmologists—especially with Mr. Wharton Jones—that the sympathetic twigs were mostly at fault. Mr. de Méric declared himself a believer in the action of remedies in general, and mercury in particular, although scepticism was, just now, in great favour. He had freely used mercury or iodide of potassium in these cases—according to the period to which the syphilitic diathesis had arrived—and was ready to advise the same line of treatment in analogous affections. The cases proved, moreover, that the third pair may be the seat of a pathological change, due to syphilis, whether the latter be recent or inveterate, or whether the symptoms be of a trifling or a very serious kind.—*Brit. Med. Journ.*, Nov. 6, 1869.

MIDWIFERY.

62. *Uterine Hemorrhage after Labour.*—Dr. Barnes read before the Obstetrical Society of London, Nov. 3, 1869, a paper on this subject. He endeavoured to define the conditions on which arrest of hemorrhage after labour depended; the action of the common remedies; and the indications of particular remedies. The ordinary remedies excited contraction of the uterus; this presupposed nerve-force enough to respond to excitation; but, when this was exhausted, remedies failed. It became then necessary to seek a new power. This was found in styptics, like perchloride of iron, which coagulated the blood in the mouths of the open vessels, and corrugated the inner surface of the uterus. Ergot, compression of the uterus, and cold, should not be trusted if they failed to act quickly. If persevered in beyond this point, they did harm. Ergot and cold added to the depression; kneading might bruise the uterus; all were apt to occasion puerperal fever. The perchloride had, in several cases, been followed by death when used for injecting nævi; but this was essentially different from injecting the uterus. In his practice, he had observed three orders of cases: in the first, all recovered well, the hemorrhage being immediately stopped. In the second series, recovery occurred, phlegmasia dolens supervening; but this was not usual after severe hemorrhage. In the third, death followed; but the patients were moribund when the remedy was applied. Here the remedy was transfusion. The practical lesson was not to persist too long in the use of cold, kneading, and other remedies, but to resort to the perchloride before collapse had set in. Dr. Barnes showed a convenient case, constructed by Krohne and Sesemann, containing a set of his dilators, a Higginson's syringe with uterine tube, and a bottle for perchloride of iron.

Dr. Rogers had used the perchloride of iron in five or six cases during the last fifteen years—always with success. He thought Dr. Barnes had omitted to mention galvanism.

Dr. Cleveland referred to the difficulty of determining when the application of the ordinary means should cease, and of leaving the patient in order to prepare an injection. An India-rubber bottle attached to a small catheter was more easily used than Higginson's syringe. He had seen vomiting do good on one or two occasions. He asked whether the use of stimulants was not open to objection.

Dr. Wynn Williams had for a long time used the perchloride of iron, applying it by means of a sponge to the interior of the uterus; the sponge was left in the uterus with a string attached.

Dr. Braxton Hicks said that there was much difference in the state of the interior of the uterus after the removal of the placenta. Sometimes the large

apertures of the sinuses described by authors were absent. In other cases the sinuses, in their oblique passage through the uterine walls, abutted on the line of separation of the placental decidua; and when the placenta was removed, severe hemorrhage would result. In the former case, the perchloride would readily act; in the latter, probably even it would fail to arrest hemorrhage.

Dr. HALL DAVIS had for several years employed iron solutions with success. He found the pernitrate, the persulphate, and the perchloride, about equally successful.

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63. *Case of Puerperal Eclampsia; Transfusion of Blood; Recovery.*—Dr. W. LANGE, believing that the true puerperal eclampsia is the result of the morbus Brightii, adopts transfusion of blood as its only rational remedy. He relates a case in which it was successfully employed. The patient had, previously to her confinement, twenty-five convulsive attacks; and, subsequently, notwithstanding local bloodletting, the application of ice, inhalation of chloroform, and morphia by injection, she experienced seven attacks of equal severity. There were now seven ounces of defibrinated blood injected into one arm, while from the other fourteen ounces were drawn. Immediately the patient's respiration became freer, the cyanosis of the face disappeared, and only a single convulsive paroxysm occurred, less violent and of much shorter duration. —*Centralblatt. f. d. Med. Wissenschaften*, Jan. 1869, No. 7. D. F. C.

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64. *Closure nearly Complete of the Orifice of the Vagina.*—A primipara was delivered of a dead child by turning and subsequent extraction. Soon after delivery she experienced a frequent desire to urinate, which could not be resisted. The entrance into her vagina she observed became also more and more constricted, until, at length, coitus became impossible. By perseverance, however, the husband at length effected an entrance, in so doing causing his wife to suffer great pain. Upon examination, Dr. UTERHART (*Berl. Clin. Wochenschr.*, 1869, No. 24) found the two edges of the orifice of the vagina united together by granulation throughout nearly their entire extent; the union ending above in a free edge, and, as it were, extending directly into the nymphæ. Above, at the point of union, and partly covered by it, was found a wide, funnel-shaped depression, which was the commencement of the urethra, through which the finger could be readily passed into the bladder. Below the inferior edge of the enlarged urethral orifice the finger passed into what seemed a blind sac, but on trial it was found that a catheter could be passed through a small opening into a canal several inches long, and then could be moved freely sideways. From this opening to the full extent of the vaginal orifice, Dr. U. split open the united parts, and took measures to prevent their reunion, until the mucous membrane of the vagina became continuous with the skin of the external parts. After two operations, a permanent *introitus vaginæ* was effected, in each diameter of which two fingers placed alongside one of the other could be introduced into the non-contracted vagina, the functions of which were unimpaired. The opening into the urethra contracted finally into a narrow slit, the inclination to urinate gradually disappeared, and the normal power to retain the contents of the bladder was regained.—*Centralblatt. f. d. Medicin. Wissenschaften*, Aug. 1869, No. 38. D. F. C.

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65. *On the Treatment of Laceration of the Perineum.*—Dr. JOHN BRINTON, Surgeon to the Royal Maternity Charity, London, contributes a paper to the *Glasgow Medical Journal* for November, 1869, in which he advocates the sewing up of the rent immediately after delivery. He narrates three cases so treated, and remarks: 1st. That the result of the *recent* operations is very satisfactory. 2d. That the operation is very easy. 3d. That it is comparatively free from danger, and is nearly painless, requiring no chloroform, because the parts which have been torn are in an anæsthetic state, being benumbed by the pressure they have recently undergone.

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66. *Oxalate of Cerium in the Sickness of Pregnancy.*—There has recently been adduced some strong evidence of the efficacy of the oxalate of cerium,

recommended some years since by Sir James Simpson, for the sickness of pregnancy. Mr. Edwin Bush states (*Brit. Med. Journ.*, Nov. 27, 1869) that he has never been disappointed with it, in many cases giving five grains three or four times a day in water. He says further, that in cases of persistent irritable stomach, arising from uterine disturbance in unmarried females and in the absence of pregnancy, he has invariably found it a good remedy.

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67. *Use of Instrumental Means for Uterine Displacements.*—Prof. Niemeyer, in his *Text-Book of Practical Medicine*, indorses the opinion of Scanzoni with regard to the abuse of instrumental means for every conceivable form of uterine displacement. He observes: "We have already said that total disappearance of a flexion must, to a certain extent, be considered as a physiological impossibility, as it is almost always accompanied by atrophy of the parenchyma of the uterus at the point of flexion. 'Flexion instruments,' sounds, redressers, and intra-uterine pessaries, which were for a time much used for flexions, do actually no good, but much harm. Scanzoni has stated plainly that in his large gynecological practice he has never cured a flexion, and that he considers the use of flexion instruments as of no use and dangerous. Tonics, also, whether used externally or internally, promise no benefit. The advice that patients with anteflexion should hold their urine as long as possible, so that the distended bladder may raise up the fundus, and that patients with retroversion should retain the feces for the same reason, is given from theoretical grounds, and has not proved correct. (Virchow says that anteflexion *results* from great distension of the bladder while the uterus is fixed.) Most gynecologists advise wearing a firm girdle around the pelvis and lower part of the abdomen, and many patients praise the result of this treatment. It is difficult to understand that, even in retroflexion, pressure on the lower part of the abdomen should relieve the patient. Perhaps, their greater ease may be due to the compression of the uterus and its consequent bloodless state.

"Little as we can do to remove the flexions, we may do much to relieve the sufferings of the patient if we treat the catarrh and parenchymatous inflammation of the uterus, which first call attention to the flexion, according to the rules laid down in previous chapters. Occasional abstractions of blood from the portio vaginalis are peculiarly beneficial, and are almost always effective in cases of flexion."

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68. *Uselessness of Drugs in the Treatment of Organic Growths from Uterus and Ovaries.*—Dr. Alfred Meadows, Physician to the Hospital for Women, expresses (*The Practitioner*, Nov. 1869) his utter disbelief in the supposed power of drugs, whether given internally or applied externally, to remove growths from the uterus or ovaries. "Whether or no," he adds, "there are any agents capable of producing the desirable effect I am not prepared to say, but we certainly have not discovered them yet."

MEDICAL JURISPRUDENCE AND TOXICOLOGY.

69. *Poisoning by Spirits of Ammonia.*—In the *Würtemb. Med. Corresp. blatt.* No. 37, 1868, Dr. Kern relates the case of a man 70 years of age, of intemperate habits, who took two swallows of spirits of ammonia; he was immediately afterwards seized with a sense of suffocation, cough, and vomiting, and, notwithstanding the means resorted to for his relief, within four hours he died; death being preceded by delirium, stupor, and spasms. A post-mortem examination showed the mouth and throat denuded of epithelium, and inflamed, in the stomach there was found a bloody fluid smelling of ammonia; at its lower portion the epithelium of the stomach was destroyed, and the muscular coat changed into a black pulpy substance. The duodenum and the serous coat of the stomach nearest the bowel were inflamed. The blood remained of a thin

fluid consistence. The body also presented the marks of the dyscrasy usually resulting from a life of intemperance. Of death from the swallowing of spirits of ammonia there are said to be only two other cases on record.—*Centralblat.f. d. Medicinisch. Wissenschaften*, Jan. 1869. D. F. C.

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70. *Phenomena Attendant upon Death by Lightning-Stroke.*—Dr. B. W. RICHARDSON has recently exhibited some highly interesting experiments performed with Prof. Pepper's induction coil, the most powerful one ever constructed, with the view of settling some doubtful points of great importance in regard to the phenomena of death by lightning.

The conclusions which Dr. R. drew from his experiments are as follows:—

1. Of the three orders of electrical discharge we have produced to-day, one only, that from the Leyden battery, is instantly fatal. In this form of discharge, therefore, we see the quality of lightning-stroke which suddenly destroys life.

2. There may be an electrical discharge made up of two distinct flashes—a tense flash combined with a burning flame or flash. The first of these is destructive to life; the second singes, scorches, perhaps blinds, but does not necessarily destroy life. In lightning shocks we may see, in the effects produced, the evidence of one or other of these discharges, or of both on one and the same subject.

3. The electrical discharge, according to its intensity, produces two distinct conditions—one a condition of nervous insensibility (anæsthesia), with continuance of involuntary muscular action, ending in recovery; the other a condition of both nervous and general muscular insensibility, ending in death.

4. After death from electrical shock, there is well-marked, often intense, and prolonged muscular rigidity—rigor mortis.

5. After death from electrical discharge, there is coagulation of blood, but the process is developed slowly within the body.

6. Animals killed by electrical discharge do not, from the mode of death, undergo putrefactive change with any exceptional rapidity.—*Med. Times and Gaz.*, May 15, 1869.

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71. *Death from taking Chloroform into the Stomach.*—Dr. E. FITZAU (*Deutsche Klinik*, 1869, No. 21) relates the case of a physician, 57 years of age, who swallowed 90 grms. of chloroform: he commenced immediately to stagger, like one intoxicated. After vomiting he sank into a deep stupor, attended with severe anæsthesia; his skin was pale and tolerably warm; his muscles were relaxed; his respiration short, and the action of his heart weak and intermittent. After the use of the stomach pump and different excitants, the epiglottis being depressed to prevent impending suffocation, an elastic tube was passed into the trachea, and immediately respiration became more free, and in about 14 hours sensibility returned. An acute gastritis became developed and rapid collapse ensued, and terminated in death at the end of 29½ hours from the time the chloroform was taken.—*Centralblatt. f. d. Med. Wissenschaft.*, Sept. 1869. D. F. C.

AMERICAN INTELLIGENCE.

ORIGINAL COMMUNICATIONS.

Successful Resection of the Ends of an Ununited Humerus, after the failure of the Seton. By WILLIAM A. GOTT, M. D., of Viroqua, Vernon Co., Wisconsin, and late Surgeon 25th Regiment Wisconsin Infantry.

A. O., æt. 40, farmer, with impaired constitution from intemperate habits, fractured his left humerus by a fall in the early part of the spring of 1861. The fracture was dressed by an ignorant practitioner, and bony union did not follow. I was consulted in the month of July following, and found at least one inch of shortening in the limb with so great mobility at the seat of the injury—the junction of the middle and lower thirds of the arm—that an effort to hold the arm in the horizontal position was attended with marked angular deformity. The limb was atrophied and its movements so limited as to prevent his engaging in any employment.

The patient had consulted me with the intention of submitting to amputation of the arm, which he had been led to believe by his friends was the only alternative, and on being assured that such a procedure would be unwarrantable, and that the arm could be restored possibly by an operation, he expressed his gratitude, and at once determined to submit to any operation that I might propose. Before resorting to operative measures, however, I deemed it important to correct the impaired state of his health, and accordingly placed him upon the use of iron and a nutritious diet.

Sept. 4, 1861. The patient visited me to-day according to previous arrangement, and with his general health so much improved as to warrant the performance of the proposed operation. The soft parts immediately over the seat of the injury posteriorly were incised to the extent of an inch to the bone, and a seton was introduced between the fragments in the usual manner. The limb was then securely placed in an angular splint.

April 4, 1862. The seton, having failed to accomplish the desired result, was removed to-day. I now proposed to the patient that he submit to the operation of resection of the ends of the fragments, to which he readily assented.

June 4, 1862. The operation was performed to-day with the assistance of Dr. H. G. Weeden, of Viroqua, and in the presence of a number of the friends of the patient. The patient having been fully placed under an anæsthetic composed of one part of chloroform and two parts of sulphuric ether, a straight incision, five inches in length, was made on the posterior aspect of the arm through the integuments and muscular tissues down to the bone, by which the parts were fully exposed, and showing that firm ligamentous union had taken place, binding down the ends of the bone. The fracture was an oblique one, and the lower fragment was overriding the upper, thereby causing the shortening. The ligamentous bands were divided, and the fragments that had become rounded and tapering at the ends were removed by means of the metacarpal saw (a chain

saw not being at hand) to the extent of half an inch so as to leave each end with a surface of the size of the natural circumference of the bone. In effecting this, great care was taken to avoid any undue laceration of the periosteum, which was dissected up to the point of division of the fragments. With a stout, short awl, a hole was drilled obliquely in each end of the bones, half an inch from their free extremities, through which a piece of small annealed iron wire was introduced, and this was twisted firmly, after the square surfaces of the bones had been brought in apposition. The hemorrhage was very trifling, the extremities of the wound were brought together with interrupted sutures, and the limb made secure in an angular splint loosely confined by a roller. Cold-water dressing was applied.

6*th*. Patient has suffered but little pain since the operation. There is considerable tumefaction of the integuments of the arm. Cold-water dressing directed to be continued.

July 6. Appears to be doing well; union by bone rapidly taking place. The wire loop is gradually loosening, and gentle traction upon it has been made from day to day for a week past. No undue irritation of the parts has been produced from the presence of the wire, the wound having closed except where the twisted wire is projecting. I was now obliged to leave the case in charge of Dr. H. G. Weeden (I having been ordered to join my regiment without delay), who from time to time kindly furnished me with the progress of the case.

Aug. 6. Osseous union quite firm, an abundant ossific deposit having taken place around the fragments, observable as well by the eye as by the touch. The wire is still retained, and as its presence does not occasion any inconvenience, it was thought best not to withdraw it forcibly.

Sept. 10. The loop of wire dropped from the wound to-day as the patient was applying some simple dressing. For the past few weeks he has been making as much use of the arm as its strength would admit of, and in so doing finds that its proper functions are being gradually resumed.

Remarks.—One interesting feature in the progress of this case is the length of time the wire-loop remained *in situ* without producing any bad result; indeed, it seemed that its prolonged retention served as a stimulus to the bone, encouraging the abundant throwing out of ossific matter. Be that as it may, it is very evident that the objections of some surgeons in respect to the use of wire, whether silver, copper, or iron, in injuries of the bones, are altogether unfounded, and that the wiring method in cases of false joint and certain kinds of fractures, is far preferable both in safety and certainty to the operations usually recommended by surgical authors, especially those of the conservative school.

The necessity of the free incision of the soft parts in order to expose the ends of the fragments, the proximity of important bloodvessels and nerves, the removal of so much of the bony structure as is often necessary, make the operation seem rather formidable compared with the usual methods. In this case, however, the local and constitutional disturbance was very slight, much less than could have been reasonably expected from so extensive an operation, and in a constitution already somewhat broken down by various excesses from early youth.

Epileptoid Convulsions caused by Carious Teeth. By JOHN W. BOOTH, M. D., of Tally-Ho, N. C.

October 7th, 1868, I visited an unmarried lady in an adjoining county

in consultation with a respectable physician of that county. She had epileptoid convulsions affecting principally some of the muscles of the neck and the right arm. These attacks had been of almost daily occurrence for four years. She had nearly continuously during this time taken many and various remedies empirically, the cause of her affection not having been ascertained, without the slightest appreciable benefit. There was a very slight disposition to anæmia, and beyond this, there was not a symptom upon which to base a diagnosis or therapeutic indication. Appetite, digestion, general health all good, circulatory and generative apparatus acting normally.

In giving the history of her case, she stated that her first spell came on during an attack of toothache. Upon examining her mouth we found half a dozen carious teeth, and determined that to extract those teeth would afford the best chance of relief. Accordingly all the carious teeth were promptly extracted. There has been no return of the convulsions since. This lady has now improved considerably in flesh, and presents no anæmic phenomena. I need hardly add that her spirits are improved in an equal degree.

January 30, 1869.

Ulcer of the Stomach; Death from repeated Hemorrhages. By JOHN J. BLACK, M. D., New Castle, Delaware.

I was summoned, September 7th, 1869, to visit a very intelligent well developed healthy looking young lady, 23 years of age, unmarried. She was lying on the parlor floor, face pale, features contracted, and pulse very weak. Her mother told me that up to this evening she had considered her in perfect health—probably complaining less than any of the family. She had eaten a hearty tea, and gone into the parlor, and was sitting at a table writing, when she suddenly became nauseated, called for a vessel and vomited about 32 ounces of clear bright red blood, together with the partially digested meal. She had another similar hemorrhage of about 40 ounces September 9th, one of about 12 ounces September 17th, and one of about 10 ounces September 21st. Early on the morning of October 1st she died. She rallied well from each attack until the last, after which she remained very weak, gradually sunk, and died as above stated. She exhibited remarkable fortitude during her illness, and her mind remained unclouded until the last.

The treatment consisted of anodynes by the rectum; liquid subsulphate of iron as an astringent internally. A little ice occasionally; nutritious enemata, and abstinence from solid food. For twenty days she was supported exclusively by enemata of beef-tea guarded by a little tincture of opium, and occasionally some sulphate of quinia. She took about five ounces every four hours. At last the bowel rejected the enemata, and we were forced to support her freely by the stomach.

On careful examination of the lungs, heart, and great vessels, nothing abnormal could be detected; leading us to believe that the hemorrhage resulted from ulcer of the stomach, involving a bloodvessel of considerable size.

Dr. Allen V. Lesley, of New Castle, was kind enough to see the patient with me, and our views of the case fully coincided. The *post-mortem* thirty-two hours after death confirmed the diagnosis made; body much emaciated and nothing abnormal found until the stomach was opened, when on its posterior surface a little below its median line and a little nearer to the

pyloric than the cardiac orifice, there appeared a firm clot of blood about the size and shape of a small almond kernel. When this was removed we found a perfect specimen of the "punched" ulcer of the stomach; elliptical in shape, scarcely one-fourth of one inch in its long axis, and one-eighth of one inch in its short axis; edges somewhat thickened and raised, and penetrating nearly to the peritoneal coat. A red line ran outwards, which proved to be an artery of considerable size, not quite cut off, and through which a small probe could pass towards the coronary artery of the stomach. Had the clot not been present, the ulcer might possibly have escaped detection, and it really appalled one to look at it, and to think that so small a lesion should destroy a valuable life. A very careful examination showed no other lesion, and the only other abnormal condition in the whole alimentary tract was an hyperæmic condition of the cardiac end of the stomach. This was examined carefully without finding the smallest solution of continuity.

This case is peculiarly remarkable from there being no premonitory symptoms of ulcer of the stomach, and up to the time of the first appearance of hemorrhage she was considered by her friends and herself in robust health. Upon close questioning, she admitted that for several months she suffered now and then from a little regurgitation of food after eating, but never vomited or had nausea, said she had had at times a little pain between the shoulders which was augmented when she had been driving, but still she never had any symptom to trouble her enough to complain seriously of it. The catamenia had not been deranged, and she was passing through this crisis when the hemorrhage first came on. During her illness she complained of a little tenderness over the epigastrium.

When a child she had several small aneurisms by anastomosis in different parts of the body, and in talking over the case the thought struck us whether such condition of the capillary vessels of the fibrous layer of the mucous membrane might not have given rise to the lesion.

The hemorrhages in this case were worthy of note. They each came in a gush, and then ceased spontaneously, none recurred in less than forty-eight hours, and others had a much longer interval; no blood could ever be detected as having passed by the bowels. This probably is important in a diagnostic point of view in showing the blood to be from a comparatively large vessel and not capillary; the loss of blood depressing the circulation and for the time stopping the hemorrhage. Had the artery in this case been entirely instead of partially divided, probably the first hemorrhage would have been the last.

This case shows that gastric ulcer may exist without giving rise to any signs, while in other cases it occasions the most alarming symptoms, and the most protracted and cruel suffering.

Hyposulphite and Bisulphite of Soda in Intermittent Fever. By JOHN P. LITTLE, M. D., of Richmond, Va.

For some four years past I have been using the hyposulphite and also the bisulphite of soda as a substitute for quinia in the treatment of intermittent and remittent fevers.

It was first used as a febrifuge in measles, scarlet fever, and similar affections; accidentally its value in fevers of a malarious origin was discovered, and I at once gave it a thorough trial.

Intermittent forms of fever prevailed very extensively immediately after

the war; and as quinia generally failed to give relief, I made free and frequent use of this remedy and with marked good effect.

I have used it in my own case; quinia had failed in removing my fever, although it had succeeded in producing an intense headache; the hyposulphite speedily relieved me.

For an adult the dose is from ten to twenty grains every three or four hours. I have given thirty grains every two hours in cases of high fever. Dissolve each dose in a wineglassful of water. As it is a mild laxative there is no necessity for the use of purgative medicine. Of the two salts, I consider the bisulphite the better in its effects.

Labour with Discharge of an Unusual Quantity of Liquor Amnii. By G. M. D. Hall, M. D., Milesburg, Pa.

About noon, March 1st, 1868, I was called to see a very large, muscular woman, æt. about forty. On examination found the os firm and rigid. Left her for a season to attend to other pressing calls, and upon my return (about one hour subsequently), patient was suffering severe labour pains. On examination during the absence of a pain, found the vertex presenting, os dilating; discovered at the time no abnormal condition of the parts. Labour continued with violence for about three-quarters of an hour longer, at which time the patient exclaimed, "There must be something wrong." On examination during a pain found the bag of waters exceedingly large, and at this time no trace of the child. I at once attempted to rupture the membranes, which was difficult, owing to their extreme toughness, but at last, after repeated attempts, I succeeded, when an instantaneous gush of an inordinate amount of liquor amnii took place and with such force as to sweep the child out with it, and as far away from the mother as the umbilical cord would allow, drenching the woman completely from head to foot, saturating the entire bed and clothing, running through on to the floor. The amount could not well be calculated. The child at first was motionless, but after a minute or two of the ordinary manipulations it uttered a feeble cry. On the face was an eruption resembling rupia. Child died of jaundice three weeks after delivery.

Addendum to Dr. G. C. Blackman's article On Abscess in Bone.—In my paper "On Certain Points connected with the Pathology and Treatment of Abscess in Bone," published in the October number of this Journal, I attempted to show that Sir Benjamin Brodie had described the chronic sinuous, as well as the circumscribed abscess of bone. The following extract from a clinical lecture on "Abscess of the Tibia," delivered at St. George's Hospital, and published in the *London Lancet*, vol. 25, p. 484 (Dec. 21st, 1833), should have been incorporated with the extracts which I made from the works of Sir Benjamin. In this lecture, at p. 485, he thus remarks:—

"Acute inflammation of the tibia may occur as well as chronic inflammation of that bone, and we know not whether it commences in the bone, the medullary membrane, or the periosteum, as, after death, or an operation, the whole mass appears amalgamated into one diseased structure. Sometimes, at an early period of the disease, the acute inflammation may be subdued by medicine. The pain and fever abate, the œdema of the leg subsides, and the periosteum becomes thinner, but the leg appears larger, owing to ossific portions of bone being deposited on the periosteum during the period of acute inflammation. This is certainly an inconvenience, but not a permanent one, for in the course of one or two years, the extra deposit of bone becomes absorbed, and

the tibia is reduced to its natural size. In this manner then the acute inflammation may terminate. Sometimes, however, the inflammation of the medullary membrane proceeds to the formation of pus, and ulceration and abscess advance through the shell of the old and new bone. After a time these burst and discharge matter. Sinuses will then form in different parts, leading down to a central ulcerated cavity in the bone, which may be dead. Cases, however, sometimes occur, in which there is no dead bone, and then granulations spring up and close the sinuses, and the case terminates without necessity for an operation. It may be, however, that an operation is required in cases where there is not a free discharge for the matter. Cut down to the periosteum, peel it off with your fingers, and apply the crown of the trephine near one of the sinuses. If you introduce a bent probe, you will frequently find a longitudinal sinus running in the direction of the bone. This you must lay open, and dress it to the bottom with dry lint. Granulations will then spring up and it will heal. There may be some some slight exfoliation of bone afterwards. Sometimes, when you can feel no dead bone, you may detect a small portion in the sinus, sufficient to keep up the irritation and inflammation of the bone."

Cincinnati, Oct. 29, 1869.

Trichiniasis. By STOCKTON HOUGH, M. D., Resident Physician, Philadelphia Hospital.

Since my report of the two cases of trichiniasis in the number of this Journal for April last, I have detected two more, and am inclined to believe that these entozoa infest the human muscles much more frequently than is generally supposed, and that they may be present in numbers ranging from six to hundreds of millions.

I am *positive* that I should not have detected the last three cases, had I not discovered the *first* one. Even that was not suspected to be an abnormal condition of the muscles by two of the physicians whose attention was particularly asked in regard to the appearance presented by the muscles. One called them air-bubbles under the fascia, and the other believed the appearance to be due to the cut ends of the fibres of the muscle dried.

Unless the trichinæ are very numerous, they will not be detected by one who has never seen them in their encysted state in the muscle, and even then they must often escape observation where their presence is not suspected.

Delivery—the Mother suffering from Prodromata of Measles; the Disease developed in both Mother and Infant on the succeeding day. By ISAAC SMITH, M. D., of Fall River, Mass.

Sept. 7th, 1869, was called to Mrs. T., æt. 25, near her term of pregnancy; waters had been discharged twelve hours previously. Five years before, she had been delivered of twins, both of whom had recently suffered from measles. Mrs. T. had some prodromata, as coryza, of the same disease, suffused eyes, cough, &c., and I thought it advisable that delivery should be effected early. This was accomplished by the administration of ergot. The child was asphyxiated when born, but was resuscitated by Marshall Hall's ready method. On my visit the next morning I found both mother and child completely marked with measles.

DOMESTIC SUMMARY.

Experiments with Chloral.—Dr. HASKET DERBY has made some experiments at the Eye and Ear Infirmary with chloral hydrates, manufactured in Boston.

"The doses given varied from thirty to seventy-five grains (two to five grammes). Thirty grains produced no sensible effect.

"In two cases where forty-five grains had been given, the pulse fell in half an hour from 80 to 70 in one case, from 96 to 84 in the other, drowsiness in either case coming on in a quarter of an hour, followed by natural sleep, which began forty-five minutes after taking the drug. Sleep continued in the first case for two and a half hours without waking, and an hour and a half at intervals afterwards.

"In the other case, with the same amount, sleep only lasted one and a quarter hours.

"In two more cases sixty grains were given, the pulse falling in one from 120 to 90, in the other from 90 to 60 in about half an hour, with increasing drowsiness. In the first case the patient did not go to sleep for two hours, and then only slept one and one-fourth hours. Whereas, the other fell asleep in an hour, sleeping heavily two hours, and at intervals for from two to three hours more.

"In another case seventy-five grains were given, the pulse falling from 125 to 100 in half an hour, sleep then coming on and continuing for four hours. It was, however, somewhat interrupted, and the patient was roused and made to answer questions without much difficulty.

"In no instance did sleep come on in less than half an hour after taking the drug. Two or three of the patients complained, on waking, of headache, lasting from one to three or four hours; but otherwise they seemed to experience no ill effects. Appetites good.

"The results obtained with this American preparation will be seen not to harmonize with those of Liebreich, who claims a much greater hypnotic power, having with from one and a half to three and a half grammes (twenty-five to thirty grains) produced sleep which lasted from five to fifteen hours. He also considers chloral an anæsthetic of some power, though inferior to chloroform and ether. Demarquay, on the other hand, in a recent report to the French Academy of Sciences, states, as the result of a series of experiments on animals and men, that he considers chloral as no anæsthetic at all, as the skin is sensitive, no matter how great the intensity of the sleep. He finds it, however, the most rapid of hypnotics."

Dr. D. subsequently gave chloral with more positive results: "One patient, who had been suffering great pain from an ulcer of the cornea, was given gr. lx. early in the evening. The pain was relieved in the course of half an hour, but the patient became somewhat delirious, and, being missed from the ward, was found wandering about alone in the upper stories of the building. On being brought back to his bed he at once went to sleep, passed the night quietly, and continued in a drowsy state all the next day. *He exhibited marked cutaneous anæsthesia*, as did also a female patient who took the same dose. Forty-five grains were given in a case of iritis, attended with severe pain, at 1 A. M. The patient, a woman of 60, went at once to sleep, and awoke the next morning free from pain, but complaining of headache."—*Boston Med. and Surg. Journ.*, Dec. 2, 1869.

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Physiological Action of Bromide of Potassium and Ammonium.—Dr. Robert Amory in a paper read before the Massachusetts Medical Society, from experiments performed on man and the lower animals, deduces the following conclusions:—

I. Bromide of potassium is easily absorbed by the mucous membrane wherever they are placed in contact.

II. This drug is *easily* absorbed by the skin, provided the water in which it is dissolved is below the temperature of 75° F. If the temperature is above 96° F., it is not absorbed.

III. The elimination is conducted by the skin and kidneys; as the saliva is a secretion, its presence in this fluid is not a proof of its elimination.

IV. In therapeutical doses bromide of potassium is not eliminated by the intestines or lungs.

V. Bromide of potassium passes out of the system without decomposition.

As most of the chemical transformation of drugs takes place, according to Bernard, in the laboratory of the kidneys, Dr. Bills' theory in regard to the interchange between chlorine and bromine in the blood, probably, is erroneous. If there is an interchange, it is in the kidneys, or outside of the body (in other words), that the transformation must occur.

VI. The effects of the drug are produced by its direct action upon the bloodvessels or the vaso-motor system which control the contraction of these vessels, which explanation may account for all the physiological or therapeutical conditions brought about by the exhibition of this drug.

VII. There is probably no different or opposing action in proportion to the dose administered, which cannot be said of all drugs. The larger the dose the more intense and the longer the action upon the vaso-motor system.

VIII. Its action upon the general nervous system is secondary, and dependent upon that of the vaso-motor nerves. That it affects certain parts where there may be a determination of blood is not contrary to the known laws of physiology. Lack of healthy resistance to disturbing influences allows the bloodvessels to be dilated, and consequently discharged. The presence of this drug stirs up the opposing influence which contracts these vessels. This influence would be exerted upon the diseased portion of the system more powerfully than upon the healthy portion.

IX. Bromide of ammonium in *almost* every respect has the same action as bromide of potassium.

Barton's Operation for Bony Anchylosis of Knee-Joint.—By GEORGE C. BLACKMAN, M. D., Prof. of Surg. During a recent professional visit to Eaton, O., my friend Dr. A. H. Stevens, had the kindness to show me a young gentleman on whom I performed the above operation in April, 1861. The result has been most gratifying. The leg is very slightly flexed, and the patient walks with a gait nearly natural. In looking over the records of the old St. John's Hospital, I find a report of the case carefully drawn up by Dr. Thomas Macmillan, a well-known surgeon of the regular army, and who, at that time, was one of the resident physicians of the institution. We copy the more important details of this report:—

"Benjamin F. Stark, æt. 20, farmer, admitted April 1st, 1861. Eleven years ago cut his right knee with an axe, making a wound seven inches long and a quarter of an inch in depth, on the inner side of the knee. This was followed by great inflammation, and when it subsided the joint was stiff and the limb straight. Some months afterwards the leg began gradually to become flexed, and finally became immovably fixed at a point which left the heel about eight inches from the floor, or nearly at a right angle. On the 2d of April, the patient being fully under the influence of chloroform, Prof. B. attempted with great force, but unsuccessfully, to break up the adhesions. In this he was assisted by Drs. Tripler and Foster. On the 5th of April, assisted by the same gentlemen, Prof. B. proceeded to perform Barton's operation of exsecting a wedge-shaped piece of bone. A semilunar incision was made over the front part of the thigh, commencing about two and one-half or three inches above the condyles. The soft parts were then detached and reflected so as to expose the bone. The saw was now applied so as to remove a wedge-shaped piece of the femur, measuring on its anterior surface about one and three-quarters of an inch in extent. At the apex of the wedge, on the posterior surface the bone was not completely divided, a few lines in thickness having been left. The patella being very prominent, the greater portion was removed. The hemorrhage was very trifling, no vessel requiring a ligature. The flap having been replaced and secured with stitches, the limb was placed in a McIntyre's splint, the angle of which being that of the limb before the operation. The patient rallied well from the operation, and the following night was passed comfortably under the influence of a quarter of grain of sulph. morphia. The next morning he suffered considerable pain, and there was some oozing of blood from the corners of the wound, which was checked by the application of cold. From the 6th to the 13th of April he suffered at times some pain in the limb, which, however, was soon relieved by small doses of morphia and mild cathartics. On

the 16th there was a profuse discharge of pus from the inner angle of the wound. This was materially diminished by the 19th, when moderate extension was made, which produced considerable uneasiness along the lower and posterior portion of the thigh. This soon subsided, and from day to day gradual extension was continued. Until the 26th of the month patient occasionally suffered from twitching of the limb, which seemed to be bent outward at the point of operation. On the 27th, the patient being under the influence of chloroform, the splint was removed while the limb was straightened, after which it was reapplied. May 17th, a piece of bone of irregular shape, and about an inch in length, was removed from the outer side of the leg, and on the 25th a second piece of about the same size was extracted. From this time the healing of the wound was rapid, and, as on the 1st of July, the openings were all closed, and the limb perfectly solid, he was discharged cured."—*Western Journ. Med.*, Aug. 1869.

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Spontaneous and Artificial Delivery of the Child in Face Presentations, with the Chin Posteriorly.—The *New York Med. Journal* (Nov. 1869) contains a paper on this subject by Dr. Isaac E. Taylor, Emeritus Prof. of Obstetrics in Bellevue Hospital Med. College. The author lays down the following propositions:—

1. That mento-posterior positions of the face are the most frequent; that spontaneous delivery may be accomplished as easily, readily, and safely, as in mento-anterior cases; that rotation of the chin forward to the pubes can occur even though the face has descended into the excavation, and sometimes just as the child appears to be born.

2. That these cases may be delivered spontaneously—by cephalic version in the pelvis, and by the passing also of the child's face over the perineum, the chin appearing first. In other cases, the occiput may emerge from under the pubes *first*.

3. That if rotation of the chin anteriorly cannot he accomplished naturally, nor by artificial resources, I propose first the *division of the perineum laterally*, on whichever side the chin presents, and before craniotomy is performed.

4. That should the natural powers of the uterus not effect delivery even after division of the perineum, the application of the long *straight* forceps should be resorted to in preference to the curved, and the direction of the traction should be made directly downward and backward.

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Persistent Priapism.—Dr. R. B. S. Hargis, relates (*New Orleans Journ. Med.*, July, 1869), a case of this which was relieved by bromide of potassium in doses of fifteen grains every two hours, given in solution. The patient had a second attack five days subsequently, and was relieved by the same medicine.

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Elephantiasis Arabum; Ligature of Main Artery; Compression and Elevation of Affected Member.—Dr. L. Bauer reports (*St. Louis Med. and Surg. Journ.*, Nov. 1869) a case of this. The subject of it was a man whose scrotum and left leg were affected with elephantiasis. Dr. B. placed a ligature on the femoral artery immediately below the profunda, June 16th. Collateral circulation being well established in two days a compressive bandage was applied to the limb. At the last report, three months subsequent to the operation, it is stated that the patient enjoyed unexceptionable health, while his local trouble has been steadily decreasing. The ligation of the artery, in this case, the operator says, has been most beneficial in reducing the size of the affected extremity. But he admits that the limb has not returned to its normal state. "I would ascribe," says Dr. B., "less importance to its [the limb] present defects in contour and shape, but the still remaining changes in the consistence of the integuments and muscles must be looked upon with apprehension and doubt as to the permanency of the improvement."

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Treatment of Aneurism by Gradual Compression.—Dr. Gurdon Buck presented to the New York Pathological Society two specimens of aneurism—one of the axillary artery, and a double one of the popliteal—with a view of show-

ing the condition of their contents in reference to two different modes of treatment.

The case of popliteal aneurism was of recent origin, and occurred in a patient over sixty years of age, of a leuco-phlegmatic temperament, and of a cachectic habit. The axillary aneurism occurred in a patient thirty-five years of age, of apparently good constitution; and in his case, also, the appearance of the disease dated back only a few months. In neither case was there a traumatic origin. Both of the patients died within a day of each other—one on the twentieth, and the other on the twenty-first. In both cases the symptoms supervening were those of pyæmia; in one there being metastatic abscesses in the lungs, in the other the inflammation confined itself chiefly to the parts in the neighbourhood of the operation.

In the case of the popliteal aneurism, the method of treatment was the application of a ligature by an instrument devised for the purpose, with the intention of compressing the artery partially during a definite period, which was thirty-six hours, and completely during twelve hours, and then removing the ligature. The ligature was passed through a double canula, and tightened by means of a miniature tourniquet, a smooth plate at the extremity of the canula resting upon the artery. The vessel was exposed, and the ligature passed round it, and then tightened by successive half turns, deliberately made, while an assistant carefully observed the effect upon the tumour. At the moment when pulsation ceased, the constriction was let up. As the result, the sac soon lost its plumpness. After this the ligature was relaxed by half turns up to the moment when the pulsation returned in the aneurism. At that point the instrument was left and steadied in the wound by appropriate dressings. When first left, the outlines of the tumour could not be distinguished, although pulsation was feeble within it. In six hours it again assumed its plumpness, was well defined, the pulsation more distinct, and the tumour firm and more resisting. Before the expiration of the first period of six hours of incomplete compression, the constriction was increased, and all the time the tumour grew more firm and harder. At the end of thirty-six hours the instrument was tightened, and left for twelve hours, and when finally removed there was no pulsation whatever, and the tumour was hard and firm.

This patient survived twenty days. Shortly after the operation, secondary hemorrhage occurred at the seat of the wound, making it necessary to cut down and apply a ligature above and below the point. The accident was perhaps explained by what was found at the post-mortem—namely, a second aneurism the size of a walnut, situated very near the bone, and higher up than the one recognized during life. Both of these sacs were, however, completely filled with clots.

In the case of the axillary aneurism, the Hunterian method was employed, and the ligature was applied in the usual way. The patient progressed favourably for fifteen days, when the ligature came away, and then he was seized with a severe rigor, and died of pyæmia a week afterwards. The centre of the sac contained some syrupy blood; but along its periphery there was a distinct and firm fibrinous deposit, arranged in layers. On the distal side of the sac there was no plug; but this was explained by the presence of branches of considerable size given off in the vicinity.

Dr. Buck then remarked upon the practicability of carrying out the idea of gradual compression by other means than those employed, advocating the finger as the most proper instrument for the purpose.—*Med. Record*, Dec. 15, 1869.

Hypodermic Use of Ergot for Post Partum Hemorrhage.—Dr. F. D. LENTE suggests (*Medical Record*, Nov. 15th, 1869) the hypodermic injection of half a drachm of Squibb's extract of ergot, repeated as often as necessary, until the specific effects of the remedy is obtained, as a means of arresting post-partum hemorrhage. He has himself tried it in one case, but as the hemorrhage had previously ceased in a great measure, the result was not conclusive as to the efficacy of the remedy.

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